HP StorageWorks

All-in-One Storage Manager

user guide

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1 All-in-One Storage Manager

HP StorageWorks All-in-One Storage Manager (ASM) is a storage hosting and management tool that radically simplifies:

- Hosting storage for applications and shared folders, page 13
- Data protection, page 33
- Managing storage, page 43
- Monitoring storage, page 47

ASM provides storage-allocation wizards that walk you through the process of allocating and configuring storage on your HP Storage Server to host application data and shared folders. The storage-allocation wizards also allow you to schedule backups, snapshots, and replication of hosted application data and shared folders.

Other wizards are provided to help you set up Exchange Server storage, SQL Server database storage, storage for user-defined applications, and storage for shared folders.

ASM is designed to work seamlessly with Windows administrator tools, HP Storage Server System Management applications, Microsoft iSCSI Target, and Data Protector Express. For example, you can change your HP Storage Server's:

- Storage allocations (quotas), shared folder permissions and names, and snapshot schedules using ASM, Windows administrator tools, and the HP Storage Server Management applications.
- Media rotation type using ASM and Data Protector Express.

However, you should not use Windows administrator tools to change the paths to storage configured on your HP Storage Server or file directories created by ASM on application servers with storage hosted on your HP Storage Server. Doing so will break the iSCSI communication paths between your application servers and HP Storage Server, and make it so ASM can no longer locate allocated storage areas on your HP Storage Server.

Software requirements

ASM comes preinstalled on your HP Storage Server. A license key is not required for ASM.

Software support

Storage for application servers running on Windows Server 2003 with SP1 and Windows Server 2008 that are on the same domain as your HP Storage Server can be hosted. Windows domain controllers (such as Windows Small Business Server) are supported by ASM as managed application servers.

ASM provides storage-management services for the following applications:

Table 1 Storage support on ASM

Microsoft Exchange Server 2003 with SP1 or later and Exchange Server 2007	See "Using the Host an Exchange Storage Group Wizard" on page 14.

File sharing services on local storage	See "Using the Create a Shared Folder Wizard" on page 16.
Microsoft SQL Server 2000 with SP4 or later, SQL Server 2005 with SP2 or later, and SQL Server 2008*	See "Using the Host a SQL Server Database Wizard" on page 17.
User-defined applications	See "Using the Host a User-Defined Application Wizard" on page 19.

* ASM does not support SQL Server 2008 databases that utilize FILESTREAM data type storage.

In order to use some All-in-One Storage Manager features, your HP Storage Server must have supporting software installed. Depending on your HP Storage Server model, these software programs are either preinstalled on the HP Storage Server or you are required to install them. The following table lists the supporting software and installation requirements. If your HP Storage Server does not come preinstalled with these software programs, go to http://www.hp.com/go/storageservers to obtain them.

Table 2 Required software for ASM features

Software	Required for:	Preinstalled on All-in-One Storage Systems	Preinstalled on ProLiant Storage Servers
Microsoft iSCSI Software Target	Hosting application storage (Exchange and SQL Server) and iSCSI-based User-Defined application storage	Yes (license key not required)	No
Data Protector Express	Creating backups to tape, other disks, or other types of storage media	Yes (license key is preinstalled)	No
HP StorageWorks Storage Mirroring version 5.0.2 or later	Replication (SWSM required on replication source and all replication targets)	No	No

Installing the All-in-One Storage Manager Agent

If you plan to perform data migration tasks for any application servers on your network using the wizards that are available in the All-in-One Storage Manager, you must first install the All-in-One Storage Manager Agent on those application servers. Follow these instructions before performing any data migration operations.

Installing the All-in-One Storage Manager Agent on network application servers

To install the All-in-One Storage Manager Agent on a network application server:

1. Locate the file at `c:\\hpnas\components\allinonestoragemanager\agent`.
2. Copy the file to the application server(s) you will use to perform data migration tasks.
3. Run the copied file on each application server to install the All-in-One Storage Manager Agent.

or

1. On the application server that stores data to be migrated, insert the *HP StorageWorks Storage System Recovery DVD.*

NOTE:

If the application server is in a remote location, use Remote Desktop Connection to access the server, copy the Agent installation files, and run the Agent installation.

2. Navigate to the \All-in-One Storage Manager\Agent folder on the DVD.
3. Double-click **asmagentinstaller.exe.**
4. Follow the on-screen installation instructions.

After completing the All-in-One Storage Manger Agent installation on the application servers, you can then schedule data migration using the HP All-in-One Storage Manager wizards.

Add an HP Storage Server

You may add another HP Storage Server for the ease of managing more than one server from the same console. To add another HP Storage Server:

1. Click on **Add HP Storage Server** in the Actions pane.
2. A dialog box will open. Enter the hostname or IP address of the HP Storage Server to add.
3. The added HP Storage Server will appear in the Navigation pane.

Remove an HP Storage Server

To remove an added HP Storage Server:

1. Click on **Remove HP Storage Server**.
2. A window will appear, asking if you would like to remove the HP Storage Server.
3. Click **Yes**.

Configuring display options

ASM allows you to customize the user interface color and scale settings.

Changing color settings

Changing color settings customizes the color used in the content pane to display the different types of storage, volumes, and servers. Colors help distinguish the different types of storage, storage areas, and servers from each other.

1. In the Actions pane, click **Configure Display Options**.

   The **Display Options** dialog box opens.
2. Select an item in the Items list and a color in the Color drop-down menu.
3. When your color selections are complete, click **Apply** to apply the color settings to the content pane.
4. Click **OK**.

Scaling display settings

Changing the scaling settings customizes the size at which each application area or shared folder is displayed in the content pane. You can choose to scale each application area and shared folder so that it is displayed in proportion to its capacity (allocated storage size), or so that all the application areas and shared folders are displayed at the same size.

1. In the Actions pane, click **Configure Display Options**.

   The **Display Options** dialog box opens.
2. Click the **Scaling** tab.
3. Select the storage-display proportion setting:
   - According to capacity, using automatic scaling—Displays logical disks and volumes, and application areas according to relative size, but leaves the display readable.
   - All as the same size—Displays logical disks and volumes, and application areas as the same size.
4. Click **Apply** to apply your change.
5. Click **OK**.

Configure Application Credentials

Use the **Application Credentials** dialog box to set or update user name and password security credentials applicable to the HP Storage Server.

1. Expand the nodes of the tree in order to view the credential status of an application server.
2. If the **Credential Status** column reads **OK** or **Not required**, no action is required for that application.
3. If the **Credential Status** column reads **Failed** or **Not set**, select the application row and then click **Update Credentials**. An **Enter Credentials** dialog box is displayed.
4. Type the user name and password of a user with sufficient privileges as described in the dialog and then click **OK**.
5. Repeat steps 1 through 4 for each application server.

Configure Storage Networks

Use the **Storage Networks** dialog box to configure a preferred private storage network for iSCSI traffic between your HP Storage Server and any connected servers that use the iSCSI protocol. This dialog box appears the first time you use the Host an Exchange Storage Group wizard, Host a SQL Server Database wizard, or Host a User-Defined Application wizard. Settings configured in this dialog box affect only iSCSI traffic.

HP strongly recommends configuring all iSCSI-based storage for application servers on a dedicated Ethernet subnet. The purpose of a private LAN for iSCSI traffic is to is to guarantee dedicated network bandwidth for storage as well as increased security.

To configure storage networks for iSCSI traffic:

1. Under **Preferred Storage Network**, select a network that will be designated to manage all iSCSI traffic.
2. Under **Available for Failover**, select a network that can be used to manage iSCSI traffic in the event that the preferred storage network fails. In the event of iSCSI initiator failure, iSCSI traffic fails over to the designated network.

NOTE:

Any existing iSCSI connections must be reset before changes take effect.

Resetting iSCSI connections

If you use the **Storage Networks** dialog box to configure a preferred private storage network for iSCSI traffic and there are one or more existing iSCSI connections on the system, the new setting will not take effect until the existing connections are reset through iSCSI Initiator on the connected systems.

To reset an iSCSI connection:

1. On the system that contains the iSCSI initiator whose connection has been changed, open Microsoft iSCSI Initiator.
2. On the **Persistent Targets** tab, select the iSCSI target that resides on your HP Storage Server and then click **Remove**.
3. On the **Targets** tab, select the iSCSI target that resides on your HP Storage Server and then click **Details**.
4. Select the target identifier from the list, click **Log off**, and then click **OK**.
5. On the **Discovery** tab, under **Target Portals** select the IP address that was previously designated for iSCSI traffic between the application server and the HP Storage Server and click **Remove**.
6. Click **Add**. In the **IP address or DNS name** field, type the IP address that was enabled for iSCSI traffic in the All-in-One **Storage Networks** dialog box and then click **OK**.
7. On the **Targets** tab, click **Log On**.
8. Check the **Automatically restore this connection when the system boots** check box and then click **OK**.
9. Click **OK** to close the **iSCSI Initiator Properties** dialog box.

2 Hosting storage for applications and shared folders

The All-in-One Storage Manager (ASM) radically simplifies hosting application storage and shared folders on your HP Storage Server, using storage-allocation wizards. Use storage-allocation wizards to allocate and configure storage for these applications:

Application	Description	Notes
Exchange	Allocate and configure storage for one or more Exchange storage group components. A wizard assists you by discovering Exchange storage group components (such as mail stores, public stores, and logs), suggesting default storage configurations based on best practices for Exchange, migrating the Exchange storage group components you selected to your HP Storage Server, and configuring Exchange to store data on your HP Storage Server.	See "Using the Host an Exchange Storage Group Wizard" on page 14 .
Shared Folders	Create shared folders on your HP Storage Server. A wizard assists you in allocating and configuring storage space for shared folders, and creating shared folders.	See "Using the Create a Shared Folder Wizard" on page 16 .
SQL Server	Allocate and configure storage for SQL Server databases. A wizard assists you by discovering servers that host SQL Server and SQL Server database components (such as data files and logs), suggesting default storage configurations based on best practices for SQL Server, migrating the SQL Server database components you selected to your HP Storage Server, optionally deleting the SQL Server database components you selected from the server that hosts SQL Server, and configuring SQL Server to store data on your HP Storage Server.	See "Using the Host a SQL Server Database Wizard" on page 17.

Application	Description	Notes
User-Defined Applications	Allocate and configure storage for any remote application over the iSCSI protocol or any other application that requires storage on the HP Storage Server. A wizard assists you in allocating and configuring storage space. The wizard does not migrate user-defined application data to your HP Storage Server or reconfigure the application to store data on your HP Storage Server. You must do this manually as described in "Migrating user-defined application data from a remote application" on page 31, and as described in the application's documentation.	See "Using the Host a User-Defined Application Wizard" on page 19.
Data Protection	Create a virtual library that backs up data from a remote system on your HP Storage Server. A wizard assists you in choosing size and storage allocation.	See "Using the Create a Virtual Library Wizard" on page 20.

Using the Host an Exchange Storage Group Wizard

The **Host an Exchange Storage Group Wizard** automatically discovers the Exchange storage groups on your application server and helps you allocate and configure storage space for these components:

- Mail stores—Contain the data in user mailboxes.
- Public stores—Contain the data in public folders.
- Logs—Provide a record of every message stored in a storage group.

Before you begin configuring storage for Exchange

- Make sure the ASM agent is installed on each server with Exchange data you plan to host.
- Make sure you have a current backup of your Exchange data and logs.

Accessing the Host an Exchange Storage Group Wizard

1. In the Actions pane, select **Host an Exchange Storage Group**.

   The**Host an Exchange Storage Group Wizard** welcome page opens.

2. Click **Next** to open the Specify Exchange Server page (see "Entering a name of a server that hosts Exchange" on page 14).

Entering a name of a server that hosts Exchange

Use the Specify Exchange Server page to provide ASM with the name or the Internet Protocol (IP) address of a remote server in your current domain that hosts Exchange.

1. Do one of the following:
   - Enter the host name of a server that hosts Exchange (exactly as it is registered in the domain).
   - Enter the IP address of a server that hosts Exchange.
2. Click **Next** to open the Select Storage Group Components page (see "Selecting Exchange Server storage group components" on page 15).

Selecting Exchange storage group components

Use the Select Storage Group Components page to select the Exchange storage group and storage group components (mail stores, public stores, and logs) you want to host on your HP Storage Server and manage using ASM.

1. Do one of the following:
   - Select the entire storage group (including all of its components) by checking the box next to the storage group.
   - Select individual storage group components by expanding the list and checking the boxes next to the components.

   You must select all the storage group components in a storage group if you want to run backups or take snapshots of the Exchange storage group using ASM.

   The table below lists the action ASM will perform for each storage group component selected.

   Table 3 Selecting storage group components to host

Action	Description
None	Component's check box is not selected, so ASM will not perform any action. Select check box to change action.
Allocate Space, Move Data	Storage space will be allocated and configured on your HP Storage Server. Component's data will be migrated to your HP Storage Server.
None, Already Managed	Component's data is already hosted on your HP Storage Server and already managed by ASM. No action is possible.

2. To view the properties for a storage group component, select the storage group component name and then click **Properties**.

   See "MailStore database properties" on page 51, "PublicStore database properties" on page 51, and "Log properties for storage group" on page 51 for descriptions of the properties displayed.
3. When you are done, click **Next** to open the Storage Allocation page (see "Allocating space for components" on page 21).

Local Continuous Replication (LCR)

If the Local Continuous Replication (LCR) feature is enabled in Microsoft Exchange 2007, you have the option of migrating LCR components to your HP Storage Server. LCR components are shown in the Select Storage Group Components page in the wizard if this feature is enabled. They are selected in the same manner as other Exchange components.

NOTE:

It is not recommended to host both the LCR and the original Exchange components on a single HP Storage Server.

Using the Create a Shared Folder Wizard

The **Create a Shared Folder Wizard** walks you through the process of creating a top-level shared folder (file share) on your HP Storage Server, including allocating and configuring the required storage.

NOTE:

You cannot create nested shared folders on your HP Storage Server using ASM. You may use other applications, such as Windows Explorer or the Shared Folder MMC snap-in, to create nested shared folders on your HP Storage Server.

Accessing the Create a Shared Folder Wizard

1. In the Actions pane, select **Create a Shared Folder**.

   The Create a Shared Folder Wizard welcome page opens.
2. Click **Next** to open the **Choose Shared Folder Types** page (see "Choosing shared folder types" on page 16).

Choosing shared folder types

Use the **Choose Shared Folder types** page to enable the types of client protocols that are allowed to connect to the shared folder.

1. Select the **Share this folder as a Windows share** check box to allow Windows clients and clients running the Server Message Block (SMB) and Common Internet File System (CIFS) protocols to connect to the shared folder.
2. Select the **Share this folder as a UNIX/Linux share** check box to allow clients running the Network File System (NFS) protocol to connect to the shared folder.

NOTE:

If the folder is shared as a UNIX/Linux share, NFS user names must be mapped to Windows users before clients can connect to the share.

If you are running a Windows-only environment, you should not select the UNIX/Linux share option.

Naming a shared folder

Use the **Enter a Shared Folder Name and Description** page to provide ASM with a name and description for the shared folder.

1. Enter the name for the shared folder.

NOTE:

The path to the shared folder is created by ASM and is based on the shared folder name. The Share Path field is *Read Only*.

2. Enter a description of the shared folder (optional).
3. Click **Next** to open the Set Shared Folder Permissions page (see "Setting permissions for a shared folder" on page 17).

Setting permissions for a shared folder

Use the Set Shared Folder Permissions page to set network user read and write permissions for the shared folder.

NOTE:

Permissions can be further customized using Windows administration tools, such as Windows Explorer and the Shared Folder MMC snap-in.

This page will display either Windows Share Security options, UNIX/Linux Share Security options, or both Windows and UNIX/Linux options depending on which shared folder types you previously selected on the **Choose Shared Folder types** page.

For Windows Share Security:

1. For Windows Share Security, select a permission level. Users can have read/write permissions (full control), read-only, or no access.
2. For UNIX/Linux Share Security, select the **Allow anonymous access** check box to allow anonymous access with the default user identifer (UID) and group identifier (GID) of 2. Select the level of anonymous access (No Access, Read-Only, or Read-Write) from the **Type of access** list. Select **Allow root access** to allow access to the root directory of the UNIX/Linux share.
3. Click **Next** to open the Storage Allocation page (see "Allocating space for components" on page 21).

Using the Host a SQL Server Database Wizard

The Host a SQL Server Database Wizard automatically discovers the servers that host SQL Server and SQL Server databases on your domain, and helps you allocate and configure storage space for each database component you select:

- Data file—Contains pointers to database files, storage for system tables and objects, and storage for database data and objects.
- Log file—Holds all the transaction log information for the database. Every database has exactly one log file, which cannot be used to hold any other data.

Before you begin configuring storage for SQL Server

- Make sure the ASM agent is installed on each server with SQL Server data you plan to host.
- Make sure you have a current backup of your SQL Server data and logs.

Accessing the Host a SQL Server Database Wizard

1. In the Actions pane, select **Host a SQL Server Database**.

   The Host a SQL Server Database Wizard welcome page opens.

2. Click **Next** to open the **Select a SQL Server** page (see "Selecting a server that hosts SQL Server" on page 18).

Selecting a server that hosts SQL Server

Use the Select a SQL Server page to select one of the servers that hosts SQL Server discovered on your domain by the wizard.

1. Do one of the following:
   - Enter the host name of a server that hosts SQL (exactly as it is registered in the domain).
   - Enter the IP address of a server that hosts SQL.
2. Click **Next** to open the **Select Database Components** page (see "Selecting SQL Server database components" on page 18).

Selecting SQL Server database components

Use the **Select Database Components** page to select the SQL Server database and database components you want to host on your HP Storage Server.

1. Do one of the following:
   - Select all components (including all of its components) by checking the box next to the component.
   - Select individual database components by expanding the list and checking the boxes next to the components.

   You must select all the database components, including the log file, in a database if you want to run backups and/or take snapshots of the database using ASM.

NOTE:

ASM cannot migrate system databases; for example, ASM cannot migrate `master`, `model`, `msdb` and `tempdb`.

The following table lists the action ASM can perform for each database component listed.

Table 4 Selecting database components to host

Action	Description
None	Component's check box is not selected, so ASM will not perform any action. Select check box to change action.
Allocate Space, Move Data	Storage space will be allocated and configured on your HP Storage Server. Component's data will be migrated to your HP Storage Server.
None, Already Managed	Component's data is already hosted on your HP Storage Server and already managed by ASM. No action is possible.

2. To view the properties for a database component, select the database component name and then click **Properties**.

   See "Data file properties" on page 55 and "Log file properties for database" on page 56 for descriptions of the properties displayed.

3. If you do not want ASM to delete the original files for the selected database components from the server that hosts SQL Server after it migrates the data to your HP Storage Server, clear the **Delete original files after successful migration** checkbox.
4. When you are done, click **Next** to open the **Select the Database Workload Type** page (see "Selecting a database workload type" on page 19).

Selecting a database workload type

Use the Select the Database Workload Type page to select the workload type for the SQL Server database.

NOTE:

You can only select the database workload type while using the Host a SQL Server Database Wizard. The database workload type cannot be changed later.

1. Do one of the following:
   - Select **Transaction processing (TP)** for frequently updated, fast growing databases with large volumes of data requiring concurrent user access.
   - Select **Decision support systems (DSS)** for databases designed to handle queries on large amounts of data, typically used for data-mining applications.
2. When you are done, click **Next** to open the **Storage Allocation** page (see "Allocating space for components" on page 21).

Using the Host a User-Defined Application Wizard

This wizard helps you set up your HP Storage Server to store application data for various applications. Storage is allocated for the application, optionally exposed to another server using the iSCSI protocol, and an NTFS file volume may be optionally created on the remote application server. Upon completion, you can monitor and manage storage for the application through the All-in-One Storage Manager.

After storage is allocated and configured on your HP Storage Server for a remote application using the Host a User-Defined Application Wizard, do the following:

- Manually migrate the remote application's data to your HP Storage Server. See "Migrating user-defined application data from a remote application" on page 31 for more information.
- Configure the remote application to store its data on the iSCSI LUN exported by ASM to the application server as described in the application's documentation.

Before you begin configuring storage for a user-defined application

- Make sure the ASM agent is installed on each application server with data you plan to host.
- Make sure you have a current backup of your remote application data and logs.
- For an iSCSI LUN application, you will need the iSCSI qualified name.

NOTE:

For a remote Windows application, you need to know the path to the iSCSI LUN on the application server to configure the remote application to store data on the iSCSI LUN. The path to the iSCSI LUN is displayed on the application's Properties window on the Storage tab.

To access the Host a User-Defined Application Wizard

1. In the Actions pane, select **Host a User-Defined Application**.

   The Host a User-Defined Application Wizard welcome page opens.

2. Click **Next** to open the Choose type of Application page (see "Choose type of application" on page 20).

Choose type of application

1. Select the type of application for hosting a user-defined application:
   - Remote Windows Application- ASM will provision storage for the application and expose the storage to the given server as an NTFS volume over the iSCSI protocol. This is the recommended option for most scenarios. The All-in-One Storage Manager agent must be installed on the application server to use this option.
   - iSCSI LUN- Exposes a LUN to the remote server so the server can store data on the LUN. You will need to install an iSCSI initiator on your host server. Storage is provisioned for these applications.
   - Local storage only- Creates a volume on your HP Storage Server. Storage is provisioned for these applications.
2. Click **Next** to open the Enter an Application Name page (see "Entering an application name" on page 20).

Entering an application name

Use the Enter an Application Name page to enter a name for the application. This name will be used anywhere the application is referenced in ASM, so it must be a *unique* name.

1. Enter a name for the application.
2. When you are done, click **Next** to open the Storage Allocation page (see "Allocating space for components" on page 21).

Using the Create a Virtual Library Wizard

This wizard helps you create a virtual library for disk-to-disk backup of other client or servers to your HP Storage Server and manage the storage for the virtual library through ASM. Install Data Protector Express on additional servers you need to backup. See "Installing Data Protector Express on other devices" on page 39 for more information.

Accessing the Virtual Library Wizard

To access the Create a Virtual Library Wizard

1. In the Actions pane, select **Create a Virtual Library**.

   The Create a Virtual Library welcome page opens.

2. Click **Next** to open the Configure virtual library page (see "Configure your virtual library" on page 21).

Configure your virtual library

To configure your virtual library, do the following:

1. In the name dialog box, type a name for your virtual library.
2. In the **Number of slots** field, type or use the arrows to indicate how many slots are needed for your virtual library.
3. When you are done, click **Next** to open the Storage Allocation page (see "Allocating space for components" on page 21).

NOTE:

The number of slots needed for your virtual library will depend on the media rotation type chosen for the backups that will use the virtual library. The number of slots must be high enough to support the rotation type you intend to use for scheduling backups to this virtual library. See *Planning for Media Rotation* in the *Data Protector Express User's Guide and Technical Reference* for more information.

Allocating space for components

Use the **Storage Allocation** page in the wizards to specify the allocated space size and advanced configuration settings for each application component or shared folder listed. Default values are provided.

1. Do one of the following:
   - Click **Next** to accept the default values that ASM has provided for the components, user-defined application, or shared folder selected.
   - Change the default size values:
     - Select a row to edit.
     - Highlight the storage size unit value and then enter a new value as necessary: megabytes (MB), gigabytes (GB), or terabytes (TB).
     - Highlight the storage size number value and enter a new value, or click the arrow buttons to change the value.

NOTE:

The **Size Range** column shows the minimum and maximum storage space that can be allocated to each application component, user-defined application, or shared folder listed. Whenever you change the allocated space size or an advanced configuration setting for an application component, the maximum value for **Size Range** is recalculated for all the application components listed.

NOTE:

To change the advanced configuration settings for an application component, user-defined application, or shared folder listed, select the item to edit and then click **Advanced**. See "Setting advanced storage properties" on page 22 for more information.

2. When you are done selecting the storage allocation and configuration settings, click **Next** to open the summary page.

NOTE:

After storage space is allocated and configured using a wizard, only the following storage configuration settings can be changed:

- Allocated space size
- Percent full warning threshold
- Enforce Allocated Limit (shared folders and local storage applications)

After a logical disk is created, its configuration cannot be changed.

Setting advanced storage properties

Use the **Advanced Storage Properties** dialog box in the ASM wizards to change the allocated space size and default advanced configuration settings for each application component, user-defined application, and shared folder listed.

After storage is configured using a wizard, you can change the allocated space size using the **Allocate Space Wizard**. See Increasing or reducing the allocated storage for more information.

Table 5 provides a brief description of the items you can modify:

Table 5 Advanced Storage Properties items

Physical storage		
Item	**Description**	**Notes**
Size	The amount of storage that ASM allocates to the application component, user-defined application, or shared folder you are configuring.	You are prevented from setting the size below 15 MB. After the allocated storage space is full (100 percent used), no further data can be stored to the space until you increase the size using the Allocate Space Wizard. The only exception is for shared folders and local storage applications without an enforced allocated limit. If there is unused storage space on the logical disk where a component without an enforced allocated limit resides, data can be written to the component until the logical disk is full.
Physical disk type	Type of physical disk to add for the hot spare.	You are able to choose SAS, (Serial Attached SCSI) SATA, (Serial Advanced Technology Attachment) or SCSI (Small Computer System Interface) for a physical disk type, depending on your hardware.*
RAID level	Hard drive formatting that provides different levels of performance, capacity, and data protection.	For more information about RAID levels, see Customizing RAID levels on page 24.*
Hot spare required	A hot spare is a hard drive reserved as a spare for storage space configured as RAID 1, 1+0, 5, or 6. A hot spare automatically replaces a hard drive when it fails. When the failed hard drive is replaced, its replacement becomes the new hot spare.	A hot spare is assigned at the array level. A LUN that does not require a hot spare may be assigned one anyway if another LUN on the same array requires a hot spare. *
Minimum number of physical disks	The minimum number of physical disks that the allocated storage will be spread across. Storage may be provisioned across more disks, but this setting determines the minimum number of disks reserved for the allocated storage.	For better performance, increase the minimum number of physical disks
Assigned logical disk	The storage area can be assigned to an existing logical disk, or it can be assigned a new disk, which is created upon completion of the scheduled tasks for the storage wizard.	
RAID stripe size	The number of bytes or kilobytes of data in each RAID stripe (block of data). The RAID stripe size selected affects performance. For the best performance, select the stripe size closest to the size of the files being saved.	ASM provides the following values: 8 KB, 16 KB, 32KB, 64 KB, 128 KB, and 256 KB.*

Physical storage		
Item	**Description**	**Notes**
Snapshot storage space (percentage of size)	Amount of storage space (as a percentage of the volume) that is reserved for storing snapshots of the storage area.	This value may be modified in order to match the change rate of the data in the storage area.
Other storage settings		
Percent full warning threshold	The percent full value that when reached changes the storage status to Warning and issues a warning alert. The warning indicates that storage use has surpassed the percentage full value. For example, if you enter 75%, you see a warning (yellow asterisk) in the content pane when storage is at 75 percent full.	The percent full warning threshold is set by default to 80%. Percent full warning threshold values are ASM-specific; percent full warning threshold values selected in the Quota Management MMC snap-in are not adopted by ASM. All other Quota Management MMC snap-in settings are adopted by ASM. See Setting a percent full warning threshold on page 26.
Enforce allocated limit (quota)	Sets an enforced quota for the amount of storage available to a shared folder or local storage application. When the storage space allocated to a component is full, no further data can be saved to this component.	This item is available for shared folders and local storage component. See Enforcing an allocated storage limit for shared folders and local storage applications on page 26.
Application server volume mount type	Indicates whether the storage area is hosted on a mount point or drive letter.	This setting does not apply to shared folders.
*After you have allocated and configured storage for an application component, user-defined application, or shared folder using a wizard, you can change the allocated space size, change the percent full warning threshold, and change the enforced allocated limit (shared folders and local storage applications). However, you cannot change the RAID level, RAID stripe size, Hot Spares, or Physical Disk Type.		

Customizing RAID levels

Before you customize the default RAID level setting, review Table 6 to see how the different RAID levels affect performance, capacity, and data protection level.

Unless you customize the advanced configuration settings, the wizard configures the storage space with the default values shown on the Advanced window:

- For Exchange and SQL Server, the wizard suggests default settings based on HP storage best practices and specific recommendations for Exchange storage group and SQL Server database components. You should generally accept these defaults.
- For user-defined applications and shared folders (where industry-standard recommendations cannot be determined), the wizard provides default settings you can customize.

Table 6 shows how the different RAID levels affect:

- Performance–The speed at which data is read from and written to the hard drives. The RAID level with the best performance rating provides the fastest reads and writes.
- Capacity–The available storage space on the hard drives. The RAID levels with the best capacity rating require the least amount of storage space to store data.
- Data protection–The number of hard drives that can fail without data being lost. The RAID level with the best data protection rating allows more hard drives to fail before data is lost.

For more information on the different RAID levels, see Table 6.

Table 6 Descriptions of RAID levels

RAID level	Description
No RAID	Offers no protection against disk failure. If a disk drive fails, data is lost.
RAID 0 – Striping (No Fault Tolerance)	Offers the greatest capacity and performance without data protection. If you select this option, you will experience data loss if a hard drive that holds the data fails. However, because no logical drive capacity is used for redundant data, this method offers the best capacity. This method offers the best processing speed by reading two stripes on different hard drives at the same time and by not having a parity drive.
RAID 1 – Mirroring	Offers a good combination of data protection and performance. RAID 1 or drive mirroring creates fault tolerance by storing duplicate sets of data on a minimum of two hard drives. There must be an even number of drives for RAID 1. RAID 1 and RAID 1+0(10) are the most costly fault tolerance methods because they require 50 percent of the drive capacity to store the redundant data. RAID 1 mirrors the contents of one hard drive in the array onto another. If either hard drive fails, the other hard drive provides a backup copy of the files and normal system operations are not interrupted.
RAID 1+0 – Mirroring and Striping	Offers the best combination of data protection and performance. RAID 1+0 or drive mirroring creates fault tolerance by storing duplicate sets of data on a minimum of four hard drives. There must be an even number of drives for RAID 1+0. RAID 1+0(10) and RAID 1 are the most costly fault tolerance methods because they require 50 percent of the drive capacity to store the redundant data. RAID 1+0(10) first mirrors each drive in the array to another, and then stripes the data across the mirrored pair. If a physical drive fails, the mirror drive provides a backup copy of the files and normal system operations are not interrupted. RAID 1+0(10) can withstand multiple simultaneous drive failures, as long as the failed drives are not mirrored to each other.
RAID 5 – Distributed Data Guarding	Offers the best combination of data protection and usable capacity while also improving performance over RAID 6. RAID 5 stores parity data across all the physical drives in the array and allows more simultaneous read operations and higher performance than data guarding. If a drive fails, the controller uses the parity data and the data on the remaining drives to reconstruct data from the failed drive. The system continues operating with a slightly reduced performance until you replace the failed drive. RAID 5 can only withstand the loss of one drive without total array failure. It requires an array with a minimum of three physical drives. Usable capacity is N-1 where N is the number of physical drives in the logical array.
RAID 6– Advanced Data Guarding (ADG)	Offers the best data protection and is an extension of RAID 5. RAID 6 uses multiple parity sets to store data and can therefore tolerate up to 2 drive failures simultaneously. RAID 6 requires a minimum of 4 drives and is available only if the controller has an enabler. Writer performance is lower than RAID 5 due to parity data updating on multiple drives. It uses two disk for parity; its fault tolerance allows two disks to fail simultaneously. Usable capacity is N-2 where N is the number of physical drives in the logical array.

Setting a percent full warning threshold

To receive a warning alert when storage capacity reaches a specified limit, set the *percent full warning threshold*. You can set a warning threshold for any application component, user-defined application, and shared folder that ASM manages. An iSCSI LUN application will not have a warning threshold.

By default, the warning threshold is set to 80%. To change it, enter a new percent value on the Advanced window.

After you set a warning threshold, ASM changes the status indicator for the application component, user-defined application, or shared folder when this threshold has been surpassed. This is a warning only; no hard limits are enforced on storage capacity as a result of setting this value. The warning is visible in these places:

- A yellow warning icon appears on the application component, user-defined application, or shared folder icon in the content pane.
- As an *alert* in the Properties window.

NOTE:

For shared folders and local storage applications, you can set an enforceable limit (or quota) for allocated storage, as well as a warning threshold. For more information, see Enforcing an allocated storage limit for shared folders and local storage applications.

Enforcing an allocated storage limit for shared folders and local storage applications

ASM provides a way to enforce an allocated storage limit for shared folders and local storage applications. If enforced, the system does not allow the amount of allocated space for a shared folder and local storage application to be exceeded.

If the capacity of the shared folder and/or local storage application surpasses the percent full warning threshold and reaches the allocated space limit, the status changes from *Warning* to *Critical* in the content pane, and users are blocked from adding data to the shared folder and local storage application.

NOTE:

If you do not choose to enforce an allocated storage limit for a shared folder, the ASM status indicator still goes from *Warning* to *Critical* in the content pane; however, users are not blocked from adding data to the shared folder as long as there is still unallocated storage space on the logical disk where the shared folder resides. Data can be written to the shared folder until the logical disk is full.

By default, the Enforce Allocated Limit (Quota) is set to **No** for all shared folders and local storage applications. To change this setting, do one of the following:

- Using the Create a Shared Folder Wizard, change the Enforce Allocated Limit (Quota) setting on the Advanced window to Yes.
- Select the shared folder in the content pane, click **Properties** in the Actions pane, click the **Warning Threshold** tab, and then select the **Enforce Allocated Limit (Quota)**.

NOTE:

If a Shared Folder is created outside of ASM, you must use the **Warning Threshold** property tab on the particular folder to enable the Enforce Allocated Limit (Quota) setting.

To allocate space for a shared folder, specify a size using the Allocate Space Wizard as described in "Increasing or reducing the allocated storage" on page 43.

Selecting data protection

Use the Data Protection window in the wizard to select the following:

- **Snapshots** (Local disk backup) Previous versions of data are retained on disk using virtual library backups and/or volume snapshots for fast recovery. See Scheduling snapshots on page 27 for more information.
- **Tape or Other Device** (Alternate location backup) Data is copied off of this HP Storage Server to tape, other disks, or other types of storage media. This enables long term storage and disaster recovery. See Scheduling backups on page 28 for more information.
- **Replication** (Live backup) Live data and snapshots (for target HP Storage Servers running ASM) are copied from this HP Storage Server to another system that is running HP StorageWorks Storage Mirroring. See Configuring replication for more information.

From this window, you can also click **Modify advanced properties** to configure advanced settings for backups and replication.

NOTE:

Backups, snapshots, and replication are disabled in ASM for an Exchange storage group or a SQL Server database if one or more of the components of the Exchange storage group or SQL Server database are not hosted. To host components for a storage group or database, start the Host an Exchange Storage Group Wizard or Host a SQL Server Database Wizard as appropriate, select the storage group or database, and then select the components on the **Select Storage Group Components** page that are not currently hosted.

NOTE:

Snapshots are taken at the volume level. See "Storage View" on page 60, for information on viewing volumes.

After you have selected and configured data protection settings, click **Next**.

Scheduling snapshots

1. On the Data Protection page in any wizard, click the button on the right side of the Snapshot Schedule box to open the Snapshot Schedule page.
2. Click **Add** to add a snapshot to the snapshot schedule.
3. Select a snapshot frequency (hourly, daily, weekly, monthly) for snapshots.
4. Enter a start date for snapshots.

5. Enter a start time for snapshots.
6. To add another snapshot to the snapshot schedule, repeat steps 2 through 5.
7. To delete a snapshot from the snapshot schedule, select the snapshot and click **Remove**.
8. Click **OK** to save your changes and return to the Data Protection page.

   The Schedule box now displays the snapshot schedule or **Multiple schedules** if there is more than one snapshot schedule.
9. After you have selected and configured all data protection settings, click **Next**

Scheduling backups

IMPORTANT:

- Before you schedule alternate location backups, install a tape library or other physical device and add it to the same Data Protector Express Management Domain as your HP Storage Server.
- Installing a tape library that can accommodate the media rotation type required by your environment requires tape storage management experience. See http://www.hp.com/sbso/serverstorage/ultimate.html to learn more about tape storage.

1. On the Data Protection page in any wizard, select **Tape or Other Device Backup**.
2. Select the device for the virtual library to reside in the **Device** list.
3. Select **Modify Advanced Properties**. This will open the **Data Protection Advanced Properties** window.
4. Select **Schedule backups to tape or another device** to enable backups on a tape library or physical device.
5. Select **Schedule backups to a local virtual library** to enable backups on a virtual library that resides on this HP Storage Server.
6. Select a Data Protector Express media rotation type from the list.
7. Type or use the arrows to indicate a time for the backup to begin.
8. For alternate location backups, select the device for the virtual library to reside.
9. For local virtual library backups, select the size for the virtual library. A default value will be recommended, based on the selected rotation type and component size. Click **Modify advanced storage properties** to modify advanced storage settings such as RAID level and stripe size. See "Setting advanced storage properties" on page 22 for more information on advanced properties.
10. Click **OK**.
11. After you have selected and configured all data protection settings, click **Next**.

Modifying backup job properties in Data Protector Express

Although it is not required, after you finish creating a backup job using a wizard or a components property page, you can modify the backup job properties in Data Protector Express. For example, you may want to enable encryption or customize a media rotation type.

1. Launch Data Protector Express.

2. On the login window:
   a. Enter `localhost` in the **Host name** field.
   b. Enter `ASMbackup` in the **User name** field.

   △ CAUTION:

   The default password for ASMbackup is blank. It can be changed in the Command Line Interface (CLI).

   c. Click **OK**.
3. Click **Jobs and Media** in the Favorites pane, located on the left side of the main window.
4. Double-click **ASMbackup** on the right side of the main window.
5. Select the backup job for the application or shared folder whose backup schedule you want to edit.
6. Right-click the file and select **Properties**.

See the *HP StorageWorks Data Protector Express Users Guide and Technical Reference* for more information.

Configuring replication

1. On the Data Protection page in any wizard, select **Replication**. The **Add Replication Target** window displays.
2. Enter the IP address or hostname of a server to add as a replication target for the storage component being configured and then click **Add**. The **Replication Target Properties** dialog box displays.
3. Do one of the following:
   - Select **Configure storage automatically** to allow All-in-One Storage Manager to automatically provision disk space on the target replication system. This option is available only if the target system is also running ASM. Click **Modify storage configuration** to change the target storage configuration.
   - Select **Manually choose a storage path** to enter a drive and folder path where data will be replicated on the target system.
4. In the **Replication set name** field, accept the default name or type a new name for the replication set.
5. From the **Target network** list, select a network on the replication target through which to route all replication traffic.
6. Click **OK**.
7. To configure additional replication targets or to modify replication properties for this component, click **Modify advanced properties** or click the box to the right of the **Replication target** field.
8. After you have selected and configured all data protection settings, click **Next**.

Reviewing task summary and scheduling tasks

1. Review the list of tasks the wizard will perform to allocate and configure storage, and to host the application storage or shared folder on your HP Storage Server.

   For application storage, ensure the following is true before you run the tasks:

   - You have an up-to-date backup of the application data and logs.
   - The application data and logs are not being accessed or modified.

2. Do one of the following:

   - To go back and change your selections, click **Back**.
   - To run the listed tasks immediately, click **Finish**.
     - The Task Viewer opens, running the tasks required to configure storage and migrate data. See Monitoring task completion status for more information.
   - To schedule tasks to run at a later time, select **Schedule tasks to run later**, enter a start date and time, and then click **Finish**.

     To select AM or PM for the start time, click the up and down arrow buttons.

     To use a calendar to select a start date, click the down arrow button (located to the right of the up and down arrow buttons) to open a calendar. To change the month displayed on the calendar, click the previous and next buttons on the calendar, or click on the month or year displayed at the top of the calendar to display drop-down lists.

Monitoring task completion status

The Task Viewer shows the status of ASM wizard tasks. ASM wizard tasks allocate and configure storage, host application storage and shared folders, and configure data protection.

NOTE:

Click the Expand tree icon next to a task to view its subtasks.

Select a task to view its description in the Details box on the Task Viewer.

The Task Viewer has a filter drop-down menu. Each selection displays information about task-completion status for different time periods:

- Show All—Displays all tasks that have been completed or failed to complete. Displays the tasks and subtasks currently being processed and all scheduled tasks.
- Today—Displays the tasks and subtasks currently being processed, all scheduled tasks, and tasks that completed or failed today.
- Last 3 Days—Displays the tasks and subtasks currently being processed, all scheduled tasks, and tasks that completed or failed during the past three days, including today.
- Last 7 Days—Displays the tasks and subtasks currently being processed, all scheduled tasks, and tasks that completed or failed during the past seven days, including today.
- Last 30 Days—Displays the tasks and subtasks currently being processed, all scheduled tasks, and tasks that completed or failed during the past thirty days, including today.
- Errors Only—Displays all tasks that have failed and provides information about problems that occurred during task processing.

The status of each task is provided and can be any one of the following:

- Scheduled—The task has been scheduled to run at a specified time.
- Verifying—ASM is confirming the configuration you specified is valid.
- Ready—The task is ready to run and is waiting for other tasks or background processes to run.
- Running—The task is being processed.
- Completed (date)—The task completed without problems.
- Cancelling—The task is being cancelled.
- Cancelled—The task has been cancelled (see Cancelling tasks).
- Failed—An error occurred during processing.

Cancelling tasks

1. To cancel an uncompleted task, select the task and click **Cancel Selected Task**.
2. Click **Yes** to confirm.

Tasks canceled after they have started may not cancel immediately. A task will stop running when the last subtask started is completed. All subtasks listed below the last completed subtask are not completed and cannot be restarted.

Migrating user-defined application data from a remote application

The Host an Exchange Storage Group Wizard and Host a SQL Server Database Wizard automatically migrate application data from the application server to your HP Storage Server. The Host a User-Defined Application Wizard, however, does not migrate data for a user-defined application from the application server to your HP Storage Server. You must do this manually.

1. Using ASM, determine the path to the iSCSI LUN (logical disk) created on the application server by ASM, as follows:
   a. Select the user-defined application in the content pane.
   b. In the Actions pane, select **Properties**.

      The Properties window opens.
   c. Click the **Storage** tab.
   d. Record the Application Path information displayed.
2. Copy the application data to the path on the application server recorded in step 1 as follows:
   a. Using Windows Explorer, navigate to the application data you want to host on your HP Storage Server.
   b. Copy the application data and paste it to the application path on the application server recorded in step 1.

      For example, if the application data is stored on `C:\application\data` and the application path you recorded is `G:\application\data`, copy and paste the data in `C:\application\data` to `G:\application\data` on the application server.
3. Delete the application data from the old path (optional).

Any data saved to the iSCSI LUN on the application server is now saved to a LUN on your HP Storage Server and not on the server.

3 Managing data protection

The All-in-One Storage Manager provides data protection through the use of snapshots, backups, and replication. You can configure these data protection methods through the **Data Protection** page of ASM's application wizards, or you can configure and modify data protection settings after running the wizards by accessing the **Snapshots**, **Backup** and **Replication** actions in the ASM Actions pane.

For more information on available data protection methods, see the following:

- "Scheduling and running snapshots" on page 33
- "Managing snapshots" on page 34
- "Scheduling backups" on page 36
- "Managing backups" on page 37
- "Running replication" on page 40

NOTE:

Backups, snapshots, and replication are disabled in ASM for an Exchange storage group or a SQL Server database if one or more of the components of the Exchange storage group or SQL Server database are not hosted. To host components for a storage group or database, start the Host an Exchange Storage Group Wizard or Host a SQL Server Database Wizard as appropriate, select the storage group or database, and then select the components on the **Select Storage Group Components** page that are not currently hosted.

Scheduling and running snapshots

From the **Snapshots** property tab, you can configure schedules for snapshots.

If replication is enabled and the replication target is also running ASM, snapshots are replicated to the target. Snapshots cannot be scheduled on a target HP Storage Server running ASM; the snapshot schedule must be set on the system that is hosting the component data.

IMPORTANT:

Snapshots are not supported on user-defined iSCSI LUN applications.

1. Select an Exchange storage group, SQL Server database, user-defined application, or shared folder in the content pane.
2. In the Actions pane, click **Snapshots** and then click **Configure Snapshot Schedule**. The **Snapshots** property tab displays.
3. Click **Add** to add a snapshot to the snapshot schedule.
4. Select a snapshot frequency (hourly, daily, weekly, monthly) for snapshots.
5. Enter a start date for snapshots.

6. Enter a start time for snapshots.
7. To add another snapshot to the snapshot schedule, repeat steps 2 through 5.
8. To delete a snapshot from the snapshot schedule, select the snapshot and click **Remove**.
9. Click **OK** .

Managing snapshots

From the **Manage Snapshots** dialog box, you can take, delete, expose, unexpose, and revert snapshots.

NOTE:

If replication is enabled and the replication target is an AiO, snapshots are replicated to the target side.

IMPORTANT:

Snapshots are not supported on user-defined iSCSI LUN applications.

Taking and deleting snapshots

To take or delete a snapshot:

1. Select an Exchange storage group, SQL Server database, user-defined application, or shared folder in the content pane.
2. In the Actions pane, click **Snapshots** and then click **Manage Snapshots**. The **Manage Snapshots** dialog box displays.
3. To take a snapshot immediately, click **Take Snapshot** and then click **Yes** to confirm.
4. To delete a snapshot, select the snapshot from the snapshot list and click **Delete**.
5. When you are done making changes, click **Close**.

NOTE:

You cannot take snapshots on a replication target system. Snapshots can instead be scheduled on the source system and replicated to the target system, where they can be exposed.

Exposing a snapshot

You can view a read-only copy of a snapshot of an Exchange storage group, SQL Server database, or user-defined application by exposing the snapshot on your HP Storage Server. Exposing a snapshot allows you to view the contents of a snapshot and selectively revert files.

If your HP Storage Server is a replication target, you can expose a snapshot in order to retrieve and restore the data that has been replicated from the source system. When exposing snapshots on a replication target, you should consider replication latency, the amount of time that is needed to copy the data from the replication source to the replication target. Note that snapshots cannot be replicated and the **Latest data** snapshot cannot be exposed while data is being synchronized from the source HP Storage Server.

The **Manage Snapshots** dialog box on All-in-One replication target systems indicates both the **Source Date & Time** and local (or target) date and time that snapshots are taken. Note that these time stamps are listed in the local time of the replication source and target systems. If the replication source and target systems are in different time zones, you should account for this factor when scheduling and exposing snapshots to ensure that the most current snapshot data has been replicated. Compare these two columns to determine the replication latency between the replication source and target and configure your snapshot schedule accordingly.

NOTE:

A snapshot of a shared folder cannot be exposed or unexposed using ASM. Use the Shadow Copy Client to view snapshots of shared folders from a client computer. Snapshots of a shared folder are stored on the same logical disk as the shared folder, in a protected system folder.

To expose a snapshot:

1. Select an Exchange storage group, SQL Server database, or user-defined application in the content pane.
2. In the Actions pane, click **Snapshots** and then click **Manage Snapshots**. The **Manage Snapshots** dialog box displays.
3. Select either **Latest data** or a snapshot from the list and then click **Expose**. The **Expose Snapshot** dialog box displays.

   Latest data represents the most current data on the system. The snapshot that is taken represents reflects the data that is on the system at that specific point in time.
4. Do one of the following:
   - Select **Mount as a volume on a remote Windows system running the All-in-One Storage Manager Agent** to expose the snapshot on a mount point on a remote server. Type the IP address or hostname and mount path of the remote server in the provided fields.
   - Select **Expose as a Windows share (SMB protocol)** to expose the snapshot on a local Windows share.
   - Select **Expose as an iSCSI LUN to an iSCSI Initiator** to expose the snapshot to a remote iSCSI initiator. Type the iSCSI Qualified Name of the iSCSI Initiator in the provided field.
5. Click **Expose**.

Unexposing a snapshot

After restoring from a snapshot, you may choose to unexpose a snapshot; unexposing a snapshot completely removes access to it. Note that unexposing a **Latest data** will result in that snapshot also being removed.

NOTE:

A snapshot of a shared folder cannot be exposed or unexposed using ASM. Use the Shadow Copy Client to view snapshots of shared folders from a client computer. Snapshots of a shared folder are stored on the same logical disk as the shared folder, in a protected system folder.

To unexpose a snapshot:

1. Select an Exchange storage group, SQL Server database, or user-defined application in the content pane.

2. In the Actions pane, click **Snapshots** and then click **Manage Snapshots**. The **Manage Snapshots** dialog box displays.
3. Select an exposed snapshot from the snapshot list.
4. Click **Unexpose**.
5. Click **Yes** to confirm.

Reverting data to snapshots

ASM allows you to revert data stored on your HP Storage Server to a snapshot. This overwrites the existing data and reverts it to a past state.

NOTE:

- Snapshots of shared folders cannot be reverted using ASM. To revert a shared folder to a past snapshot, use the Shadow Copy Client.
- Snapshots of user-defined applications that are configured as local storage only applications cannot be reverted using ASM because all data that is on the same volume as the application would also be reverted.

1. Select an Exchange storage group, SQL Server database, or user-defined application in the content pane.
2. In the Actions pane, click **Snapshots** and then click **Manage Snapshots**. The **Manage Snapshots** dialog box displays.
3. Select a snapshot from the list and click **Revert**.
4. Click **Yes** to confirm.

Scheduling backups

From the **Backup** property tab, you can schedule and configure backups.

NOTE:

On All-in-One replication target systems, you must have snapshots scheduled in order to also schedule backups. These scheduled backups use the latest available snapshot at the time the backup runs. You should account for replication latency when scheduling the snapshot on the source HP Storage Server and the backup on the target HP Storage Server.

1. Select an Exchange storage group, SQL Server database, user-defined application, or shared folder in the content pane.
2. In the Actions pane, click **Configure Backup**. The **Backup** property tab displays.
3. Select **Schedule backups to tape or another device** to enable backups on a tape library or physical device.
4. Select **Schedule backups to a local virtual library** to enable backups to a virtual library that will be created on this HP Storage Server.
5. Select a Data Protector Express media rotation type from the list.
6. Type or use the arrows to indicate a time for the backup to begin.

7. For backups to tape or other devices, select the backup device.
8. For local virtual library backups, select the size for the virtual library. A default value will be recommended, based on the selected rotation type and component size. Click **Modify advanced storage properties** to modify advanced storage settings such as RAID level and stripe size. See "Setting advanced storage properties" on page 22 for more information on advanced properties.
9. Click **OK**.
10. Click **OK** on the **Review Task Summary** dialog box to confirm the backup settings.

Managing backups

After scheduling backups, you can manage backups for Exchange storage group, SQL Server database, user-defined application, or shared folders. Based on the backup features that have been configured, you can run a device backup, run a virtual library backup, or run the **Restore From Backup** wizard.

IMPORTANT:

Backups are not supported on user-defined iSCSI LUN applications.

For Exchange storage groups, if the only configured backup is on an All-in-One replication target system, the Exchange logs are not are not truncated as they normally would be after a successful backup. To change this default behavior, edit the `hpkas-config.xml` file on the Exchange server, located at `c:\Program Files\HP\HP All-in-One Storage Manager\`. Change the value of `<SendBackupSuccessOnReplicatedSnapshot>` from `false` to `true`.

Running a device backup

If an alternative backup device has been assigned, you can use **Run Device Backup** to run an alternative location backup for the selected component.

1. Select an Exchange storage group, SQL Server database, user-defined application, or shared folder that has backups scheduled in the content pane.
2. In the Actions pane, click **Backup** and then click **Run Device Backup**.
3. Click **Yes** to confirm the backup operation.

Running a virtual library backup

If virtual library backup has been configured for this component, you can run a virtual library backup from this location.

1. Select an Exchange storage group, SQL Server database, user-defined application, or shared folder that has backups scheduled in the content pane.
2. In the Actions pane, click **Backup** and then click **Run Virtual Library Backup**.
3. Click **Yes** to confirm the backup operation.

Restoring data from backups

ASM allows you to restore data to your HP Storage Server from the latest backups created using Data Protector Express. You can choose to overwrite the existing data with the backup, or restore the backup to an unused space on your HP Storage Server so you can selectively overwrite existing data.

If you want to restore data using a backup other than the latest backup, see *Selecting files for restoring* in the *HP StorageWorks Data Protector Express Users Guide and Technical Reference* for more information.

1. Select an Exchange storage group, SQL Server database, user-defined application, or shared folder that has backups scheduled in the content pane.
2. In the Actions pane, click **Backup** and then click **Restore from Backup**. The **Restore From Backup Wizard** displays.
3. Do one of the following:
   - Select **Overwrite Restore** to overwrite the existing data with the backup.
   - Select **Different Location Restore** to save the backup to a different location, and then enter the location (path) where you want the backup saved on your HP Storage Server. To browse for the location, click **Browse**.
4. Click **Next**.
5. Click **Launch DPX** to launch Data Protector Express. See Using DPX to restore data) for Data protector Express instructions.
6. After the restore is complete, click **Finish** to exit the wizard.

Using DPX to restore data

1. When the login window appears, do the following:
   a. Enter `localhost` in the **Host name** field.
   b. Enter `ASMbackup` in the **User name** field.

   △ CAUTION:

   The default password for ASMbackup is blank. It can be changed in the Command Line Interface (CLI). See "Setting the password for the ASMbackup user account" on page 39 for more information.

   c. Click **OK**.
2. Click **Jobs and Media** in the Favorites pane, located on the left side of the main window.
3. Double-click **ASMbackup** on the right side of the main window.
4. Select the restore job for the application or shared folder whose data you want to restore.

NOTE:

To modify properties of the job, right-click the **Restore Job Properties**. For example, you may want to choose a different device from which to restore or select different version of files to restore. To restore version for files other than the latest backup, refer to *Selecting Files and File Versions* in the *HP StorageWorks Data Protector Express Users Guide and Technical Reference*.

5. Right-click the restore job and click **Run** to perform the restore.
6. Click **Yes** to confirm the restore.

   To view the status of the restore job, click **Job Status** in the Favorites pane.

7. Exit Data Protector Express.

Setting the password for the ASMbackup user account

To set or change the ASMBackup user password:

1. Use the Command Line interface (CLI) found at `C:\Program Files\HP\HP All-in-One Storage Manager\hpkacli.exe`.

   The password may be set interactively, allowing the password characters to be masked, or it may be set with a single command.
2. Use the following command to display usage details:

   ```
   > hpkacli /?
   ```
3. To specify a password, type the following:

   ```
   > hpkacli set password
   ```
4. This will bring up the following:

   ```
   Current password for ASMbackup:
   New password for ASMbackup:
   Confirm new password for ASMbackup:
   ```
5. If the current password for ASM backup is blank, press return when prompted. Otherwise, enter the current password.
6. Confirm the new password by typing in password again under Confirm new password.
7. The password has been set.

Using the Administrator account to change the ASMbackup password

1. Use the Command Line interface (CLI) found at `C:\Program Files\HP\HP All-in-One Storage Manager\hpkacli.exe`
2. Type in the following:

   ```
   > hpkacli set password /admin
   ```
3. This will bring up the following:

   ```
   Password of Admin user:
   New password for ASMbackup:
   Confirm new password for ASMbackup:
   ```
4. Type the Data Protector Express admin password.
5. Type in the new password for the ASMbackup account.
6. Confirm the new password by typing it in again.

Installing Data Protector Express on other machines

The Data Protector Express installation on the HP Storage Server acts as the master server for a Data Protector Express Management Domain. If you wish to use the All-in-One system as a Disk-To-Disk (D2D) backup target for other clients or servers, you may install Data Protector Express on those machines and join the management domain.

NOTE:

Installing Data Protector Express on other servers is not required to backup Exchange, SQL Server, or User-Defined applications, when those applications are hosted by All-in-One Storage Manager. The instructions provided here are only needed if a user wishes to use AiO as a backup target for additional user data in their environment.

The HP Storage Server provides the Data Protector Express installer at `c:\hpnas\components\dpx`. This installer may be used to install Data Protector Express on 32–bit or 64–bit Windows operating systems. As an alternative, and for Linux installations, you may also download and install Data Protector Express from http://h18006.www1.hp.com/products/storage/software/datapexp/.

1. When installing Data Protector Express on another machine, select **Join an existing Data Protector Express domain**.
2. When prompted, provide the hostname or IP address of the HP Storage Server.

An unlimited number of client platforms such as Windows XP and Vista may be added to the Data Protector Express domain managed by the HP Storage Server. Server platforms such as Windows Server 2003 will require one license per protected server. The following license is required for server platforms such as Windows Server 2003:**HP Data Protector Express Network Client Agent BB121AA**.

You may use ASM to create and manage storage for Data Protector Express virtual libraries on the HP Storage Server. You may then create backup jobs in Data Protector Express that use these virtual libraries as targets for Disk-to-Disk backups of your protected clients and servers. See "Using the Create a Virtual Library Wizard" on page 20 for more information.

NOTE:

When manually creating or modifying backup jobs that were not created by ASM, do not use the Data Protector Express ASMbackup account. It is recommended that you create other Data Protector Express user accounts as needed.

Running replication

From the **Replication** property tab, you can configure data replication, the process of copying live data and snapshots (if the target system is also running ASM) from your HP Storage Server to another system that is running HP StorageWorks Storage Mirroring.

IMPORTANT:

In order to use replication with the HP Storage Server, HP StorageWorks Storage Mirroring version 5.0.2 or later must be installed on the replication source and all replication targets. To install a trial version of HP StorageWorks Storage Mirroring, in the HP Storage Server Management console, double-click **Data Protection** and then click **HP StorageWorks Storage Mirroring**.

1. Select an Exchange storage group, SQL Server database, user-defined application, or shared folder in the content pane.
2. In the Actions pane, click **Configure Replication**. The **Replication** property tab is displayed.
3. Click **Add**. The **Add Replication Target** dialog box displays.

4. Enter the IP address or hostname of a server to add as a replication target for the storage component being configured and then click **Add**. The **Replication Target Properties** dialog box displays.
5. Do one of the following:
   - Select **Configure storage automatically** to allow All-in-One Storage Manager to automatically provision disk space on the target replication system. This option is available only if the target system is also running ASM. Click **Modify storage configuration** to change the target storage configuration.
   - Select **Manually choose a storage path** to enter a drive and folder path where data will be replicated on the target system.
6. In the **Replication set name** field, accept the default name or type a new name for the replication set.
7. From the **Target network** list, select a network on the replication target through which to route all replication traffic.
8. Click **OK**.
9. To configure additional replication targets for this component, click **Add** and repeat steps 4 through 9. When configuring multiple replication targets from a single replication source, snapshots from the replication source are replicated to all replication targets.

NOTE:

By default, compression is disabled for replication. In order to enable compression and configure other settings such as bandwidth throttling and transmission schedules, you must use the HP StorageWorks Storage Mirroring Management Console.

NOTE:

If replication is enabled and the replication target is an AiO, snapshots are replicated to the target side.

Pausing and resuming replication

When replication is paused, all changed data is queued on the source system. The changed data is not replicated to the target system until replication is resumed.

1. In the content pane, select an Exchange storage group, SQL Server database, user-defined application, or shared folder that is currently replicating data in the content pane.
2. In the Actions pane, click **Replication** and then click **Pause replication to <target>**.
3. Click **Yes** to confirm the pause operation.
4. To resume replication, select the component in the content pane, and in the Actions pane, click **Replication** and then click **Resume replication to <target>**.
5. Click **Yes** to confirm the resume operation.

   When replication is resumed, Storage Mirroring executes a re-mirror of the data.

4 Managing storage

After an application is hosted or shared folder is created on your HP Storage Server using a storage-allocation wizard, you can manage its storage and data by:

- Increasing or reducing the allocated storage, page 43
- Changing the percent full warning threshold, page 44
- Removing application areas from view, page 44
- Changing permissions, names, descriptions, or paths of shared folders, page 45
- Deleting shared folders, page 45

Increasing or reducing the allocated storage

You can increase or reduce the storage allocated to an application component, user-defined application, or shared folder after storage is initially allocated and configured using a storage-allocation wizard.

Increasing the storage allocated requires ASM to grow the logical disk (increase the amount of hard drive space allocated to the logical disk) holding the data. Reducing the allocated storage does not reduce the size of the logical disk holding the data, because once hard drive space is allocated to a logical disk, it cannot be unallocated due to the configuration of hard drives.

NOTE:

Unallocated storage on a logical disk is re-allocated by ASM when new or additional storage is allocated to an application component or shared folder and the advanced configuration values selected for the storage matches those of the logical disk.

For example, if an application component or shared folder's allocated storage is increased, any unallocated space on the logical disk where it resides is used before the logical disk grows.

1. Select the application component, user-defined application, or shared folder in the content pane.
2. In the Actions pane, click **Allocate Space** to open the Allocate Space wizard.
3. Change the size value:
   - Highlight the storage size unit value and then enter a new value as necessary: megabytes (MB), gigabytes (GB), or terabytes (TB).
   - Highlight the storage size number value and enter a new value, or click the arrow buttons to change the value.

   The Size Range field shows the minimum and maximum storage space that can be allocated to an application component, user-defined application, or shared folder. Whenever you change the storage space allocated to an application component or change an advanced configuration setting for an application component, the maximum value for Size Range is recalculated for each application component shown.
4. Click **Next** to open the Review Tasks Summary page (see "Reviewing task summary and scheduling tasks" on page 30) for more information.

Changing the percent full warning threshold

You can change the percent full warning threshold value for an application component, user-defined application, or shared folder after storage is initially allocated and configured using a storage-allocation wizard. See Setting a percent full warning threshold on page 26 for more information.

NOTE:

For shared folders, you can set an enforced limit (quota) for allocated storage, as well as a warning threshold. For more information, see Enforcing an allocated storage limit for shared folders and local storage applications on page 26.

To change the percent full warning threshold from the Properties window:

1. Select the application component, user-defined application, or shared folder in the content pane.
2. In the Actions pane, click **Properties**.
3. Click the **Warning Threshold** tab.
4. Change the percent full warning threshold value.
5. Click **OK**.

Removing application areas from view

You can remove application components and user-defined applications from view on the ASM user interface. This allows you to remove storage information from the content pane pertaining to storage allocations lost due to hard drive failure or storage for an application component or user-defined application whose storage you plan to unhost.

Removing an application component or user-defined application from view does not unhost its storage. Its storage is still hosted on your HP Storage Server. To permanently remove storage from your HP Storage Server, you must first remove the storage that is hosted by ASM. Depending on the type of storage, see http://h71028.www7.hp.com/ERC/downloads/4AA1-1026ENW.pdf for information on how to remove different types of storage.

NOTE:

If you remove an application component or user-defined application from view without unhosting the storage, your HP Storage Server will re-discover the applications immediately.

NOTE:

This action is not available for shared folders. Because ASM automatically discovers top-level shared folders on your HP Storage Server, the folder would just reappear after the next discovery process. A shared folder is automatically removed from view when it is removed from your HP Storage Server.

To remove an application component or user-defined application from view:

1. Permanently remove storage from your AiO, depending on the type of application. The application component will still remain in the content pane.

2. Select the application component or user-defined application to remove in the content pane.
3. In the Actions pane, click **Remove from View**.

   A confirmation dialog box opens.
4. Do one of the following:
   - Click **OK** to remove the item from view.
   - Click **Cancel** to cancel the action.

Changing permissions, names, descriptions, or paths of shared folders

ASM cannot be used to change permissions, names, descriptions, or paths of top-level or nested shared folders that reside on your HP Storage Server. Use Windows Explorer or the Shared Folder MMC snap-in to change permissions, names, descriptions, or paths of shared folders that reside on your HP Storage Server.

ASM automatically discovers and adopts any changes you make to the permissions, names, descriptions, or paths of shared folders using other applications. You do not have to make any changes in ASM to implement the changes. Click **Refresh** in the Actions pane (or perform any action in ASM) to update the ASM user interface to display your changes.

You will need to know the path of a shared folder to change its permissions, name, description, or path. To find the path, select the shared folder in the content pane and then click **Properties** in the Actions pane. The share path listed on the General tab is the path for the shared folder.

Deleting shared folders

ASM cannot be used to delete top-level or nested shared folders that reside on your HP Storage Server. Use Windows Explorer or the Shared Folder MMC snap-in to delete shared folders that reside on your HP Storage Server.

A shared folder is automatically removed from view on the ASM user interface when it is deleted from your HP Storage Server.

5 Monitoring storage

ASM provides storage-management functions so you can quickly view used and allocated storage, and percent full warning thresholds settings for application and shared folder storage on your HP Storage Server. You have a choice of these views for the content pane:

- Application View, page 47—Monitoring the overall used and allocated storage values for specific applications and shared folders (such as Exchange or SQL Server storage)
- Storage View, page 60—Monitoring the used and allocated storage values for the logical disks and volumes on your HP Storage Server that ASM created to host application storage and shared folders.
- Application Server View, page 63—Monitoring the application servers with storage hosted on your HP Storage Server.
- Storage Utilization View, page 65—Monitoring the allocated storage values for specific applications and the shared folders pool, the unallocated storage value, and the storage value for data not managed by ASM.

Views are selected from the Actions pane.

You can also quickly view storage status on the content pane. Status icons for warnings and critical conditions are displayed on top of icons in the content pane when storage status changes from OK to Warning or Critical.

NOTE:

Select an item in the content pane and then click **Properties** in the Actions pane to view any alerts for the item.

IMPORTANT:

During the ASM discovery process, if ASM detects a user-defined storage area that hosts SQL or Exchange data and the proper credentials have been set between ASM and the application server, these user-defined storage areas are moved to SQL or Exchange storage areas as appropriate. For more information about setting application credentials between ASM and application servers, see "Configure Application Credentials" on page 10.

Application View

Application View displays the used and allocated storage space, and storage status of applications and shared folders hosted on your HP Storage Server in the content pane.

- In the Actions pane, select **Application View**.
- To view all the application storage and shared folders hosted on your HP Storage Server in the content pane, select **Show all** from the Filter drop-down menu, located at the top of the content pane.

Application storage properties are displayed in order of hierarchy in an expandable and collapsible view.

Click the Expand tree icon next to each application to view the used and allocated storage properties for the hosted application components. Click the Collapse tree icon next to expanded applications to hide the application component storage properties.

To view all the storage properties for an item listed in the content pane, see Accessing application and shared folder properties.

Accessing application and shared folder properties

When Application View is selected in the Actions pane, you can view the storage status, alerts, and properties for the following:

- Applications
- Application components
- User-defined applications
- Shared folders pool
- Shared folders
- Virtual libraries
- Replication Target Components

Do one of the following:

- Select the item in the content pane and then click **Properties** in the Actions pane.
- Right-click the item in the content pane and select **Properties**.

NOTE:

ASM rolls up all status alerts to the highest level. For instance, if a top-level shared folder has surpassed its percent full warning threshold and exceeded its enforced allocated storage space, a warning message is shown in the shared folders pool. Likewise, if a critical status alert exists in an Exchange mail store, that alert is also shown in the status for the Exchange storage group.

Accessing properties for Exchange, Exchange storage group, and Exchange storage group components

ASM provides properties information for Exchange, Exchange storage group, and Exchange storage group components when Exchange storage is hosted on your HP Storage Server.

1. In the Actions pane, select **Application View**.
2. From the Filter drop-down menu, select **Exchange** or **Show all**.
3. To access Exchange:
   - Select **Exchange** in the content pane and then click **Properties** in the Actions pane.
   - Right-click **Exchange** in the content pane and select **Properties**.

To access Exchange Storage groups and components:

- Select any **Exchange storage group** or **Exchange storage group component** in the content pane and then click **Properties** in the Action pane.
- Right-click any Exchange storage group or component in the content pane and select Properties.

Properties window

ASM provides properties information for Exchange, Exchange storage groups, and components for storage hosted on your HP Storage Server. The following lists the tabs available in the properties window, and in parenthesis, if it applies to Exchange, Exchange storage groups, or Exchange storage group components.

- **General tab**—(Exchange, Exchange storage groups, and components) Displays the name of the application, the total capacity reserved for the application, and its operating status:

Table 7 General tab: Exchange properties

Status indicator	Value
OK	Exchange is running and storage is online. No alerts.
Warning	See the Alerts list for more information.
Critical	See the Alerts list for more information.

- **Details tab** — (Exchange storage groups) Displays the following Exchange server values:

Table 8 Details tab: Exchange storage group properties

Property	Value
Exchange Server	Name of server where Exchange storage is being hosted.
Exchange Version	Version of Exchange.
Days before log file removal	The number of days before log files are deleted from the server.
Directory Server	The domain controller used by the server.
Server Type	The type of Exchange installation: Front-end or Back-end. ASM can only host storage from Back-end Exchange servers, because Front-end Exchange installations do not actually store mailboxes and other Exchange data.
Clustered	Indicates whether the server that hosts Exchange Server is part of a cluster.
Replication Type	Type of Exchange replication enabled.
LCR status	Indicates Exchange status for LCR.
LCR Copy	Indicates if Exchange component is the original or a copy.
LCR Log Folder Copy	Path to the LCR log file copies
LCR System Folder Copy	Path to LCR system file copies

- **Snapshots tab** — (Exchange storage groups) Allows you to schedule snapshots of the storage group. For more information, see "Scheduling and running snapshots" on page 33.
- **Backup tab** — (Exchange storage groups) Allows you to schedule backups of the storage group. See "Scheduling backups" on page 36 for more information.
- **Replication tab** — (Exchange storage groups) Allows you to configure data replication of the storage group. See "Running replication" on page 40 for more information.

- **Storage tab**—(Exchange storage group components) Displays the storage group component's storage space, including allocated space, used space, free space, and the following storage allocation details:

Table 9 Storage tab: Exchange storage group component properties

Property	Value
Application Path	Path to the file directory on the server that hosts Exchange where the storage group component's data is saved by Exchange. The file directory is located on the volume created on the iSCSI LUN exported by ASM to the server that hosts Exchange.
Application Server Host Name	Name of server that hosts Exchange and the storage group component.
Application Server Volume - Name	Name of the volume on the server that hosts Exchange to which Exchange saves the storage group component's data. The volume resides on the iSCSI LUN exported by ASM to the server that hosts Exchange.
Application Server Volume - Status	Status of the volume on the server that hosts Exchange where the storage group component is stored.
Application Server Volume - Mount Paths	Path the volume is mounted on, on the server that hosts Exchange. The volume is built on the iSCSI LUN exported by ASM to the server that hosts Exchange.
Storage server host name	Name of your HP Storage Server.
Storage server volume - Name	Name of the volume on your HP Storage Server where the storage group component's data is stored.
Storage server volume - Status	Status of the volume that holds the storage group component on your HP Storage Server.
Storage server volume - Mount paths	Path to where the volume that holds the storage group component on your HP Storage Server is mounted.
Logical disk - RAID Level	The RAID level to which the storage group component storage is configured. See Customizing RAID levels on page 24 for more information.
Logical disk - RAID Stripe Size	The RAID stripe size to which the storage group component's storage is configured. See Table 5 on page 23 for more information.
Virtual array - Number of Hot Spares	The number of hot spares with which the storage group component storage is configured. See Table 5 on page 23 for more information.
Virtual array - Physical disk type	Type of physical disk designated for the hot spare. Physical disk types include SAS, SATA, and SCSI.

- **Warning Threshold tab**—(Exchange storage group components) Allows you to change the Percent Full Warning Threshold value for the storage group component. See Setting a percent full warning threshold on page 26 for more information.
- **Mail Store, Public Store, or Log tab**—(Exchange storage group components) One of these three tabs is available depending on whether the storage group component is a mail store, public store, or log.

- **Mail Store tab**—Displays the status and properties of the mail store reported byt the Exchange server.

  Table 10 Mail Store tab: Exchange storage group component properties

Value	Description
Mail Store Name	Name of storage group mail store.
Online	The storage group mail store is available for use.
Database File	Path to the file that stores all messages submitted through MAPI, as well as the database tables that define mailboxes, messages, folders, and attachments.
Streaming Database File (Exchange 2003 only)	Path to the file that stores Internet-formatted messages, such as native Multipurpose Internet Extensions (MIME) content.
Replication type	Indicates if LCR is being used.
LCR Status	Indicate Exchange warnings for LCR.
LCR Copy	Copy of the active/original exchange component.
LCR Database Copy File	Path to LCR mailstore copy

- **Public Store tab**—Displays the public store's free space and the following storage allocation details about the public store:

  Table 11 Public Store tab: Exchange storage group component properties

Value	Description
Public Store Name	Name of storage group public store.
Online	The storage group public store is available for use.
Database File	Path to the file that stores all messages submitted through MAPI, as well as the database tables that define mailboxes, messages, folders, and attachments.
Streaming Database File (Exchange 2003 only)	Path to the file stores Internet-formatted messages, such as native Multipurpose Internet extensions (MIME) content.
Replication Type	Indicates if LCR is being used.
LCR Status	Indicate Exchange warnings for LCR.
LCR Copy	Copy of the active/original exchange component.
LCR Database Copy File	Path to the LCR public folder copy

- **Log tab**—Displays the log's free space and the following storage allocation details about the log:

  Table 12 Log tab: Exchange storage group component properties

Value	Description
Path	Path to the log file.

Value	Description
Circular Logging	Indicates whether or not circular logging is enabled. If enabled, a new log entry will replace the oldest log entry when the size limit is reached.
Replication Type	Indicates if LCR is being used.
LCR Status	Indicate Exchange warnings for LCR.
LCR Copy	Copy of the active/original exchange component.
LCR Log Folder Copy	Path to the LCR log file copies
LCR System Folder Copy	Path to LCR system file copies

Accessing properties for shared folders

ASM provides properties information for shared folders pool and for any shared folder on your HP Storage Server. Using properties information, you can determine details about shared-folder status, including allocated space, whether shared-folder storage is online or offline, and any warning or critical status indicators.

1. In the Actions pane, select **Application View**.
2. From the Filter drop-down menu, select **Shared Folders** or **Show all**.
3. Do one of the following:
   - Select **Shared Folders** in the content pane and then click **Properties** in the Actions pane.
   - Right-click **Shared Folders** in the content pane and select **Properties**.

- **General tab**— (Shared folders pool, shared folders) Displays the shared folder name, type of shared folder, share path on your HP Storage Server, share description, and the shared folder operating status:

  Table 13 General tab: Shared folder properties

Status indicator	Value
OK	The storage is online.
Warning	The storage has surpassed the percent full warning threshold. See the Alerts list for more information.
Critical	Shared folder storage has past the allocated storage limit and alerts are shown. See the Alerts list for more information.

- **Storage tab**—(Shared folders) Displays the shared folder storage space, including allocated space, used space, free space, and the following storage allocation details:

  Table 14 Storage tab: Shared folder properties

Property	Value
Application Path	Path to the shared folder on the server.
Storage Server Host Name	Name of your HP Storage Server.

Property	Value
Storage Server Volume - Name	Name of the volume on your HP Storage Server where the shared folder is stored.
Storage Server Volume - Status	Status of the volume that holds the shared folder on your HP Storage Server.
Storage Server Volume - Mount Paths	Path to where the volume that holds the shared folder on your HP Storage Server is mounted.
Logical disk - RAID Level	The RAID level to which the shared folder's storage is configured. See Customizing RAID levels on page 24 for more information.
Logical disk - RAID Stripe Size	The RAID stripe size to which the shared folder's storage is configured. See Table 5 on page 23 for more information.
Virtual array - Number of Hot Spares	The number of hot spares with which the shared folder's storage is configured. See Table 5 on page 23 for more information.
Virtual array - Physical disk type	Type of physical disk designated for the hot spare. Physical disk types include SAS, SATA, and SCSI.

- **Shared Folder Type tab** — (Shared folders) Allows you to enable the types of client protocols that are allowed to connect to the shared folder.
- **Warning Threshold tab**—(Shared folders) Allows you to enable or disable the enforcement of the allocated space limit for the shared folder. See Enforcing an allocated storage limit for shared folders and local storage applications on page 26 for more information. Also, allows you to change the shared folder's percent full warning threshold value. See Setting a percent full warning threshold on page 26 for more information.
- **Snapshots tab** — (Shared folders) Allows you to schedule snapshots of the shared folder. For more information, see "Scheduling and running snapshots" on page 33..
- **Backup tab** — (Shared folders) Allows you to schedule backups of the shared folder. See "Scheduling backups" on page 36 for more information.
- **Replication tab** — (Shared folders) Allows you to configure data replication of the shared folder. See "Running replication" on page 40 for more information.

Accessing properties for SQL Server

ASM provides properties information for SQL Server when SQL Server storage is hosted on your HP Storage Server.

1. In the Actions pane, select **Application View**.
2. From the Filter drop-down menu, select **SQL Server** or **Show all**.
3. Do one of the following:
   - Select one of the following:**SQL Server, SQL Server database or a SQL Server database component** in the content pane and then click **Properties** in the Actions pane.
   - Right-click **SQL Server, SQL Server database or a SQL Server database component** in the content pane and select **Properties**.

Properties window

ASM provides properties information for the SQL server, databases and database components when SQL Server storage is hosted on your HP Storage Server. The following lists the tabs in the properties

window, and in parenthesis, which applications are applicable: SQL Server, SQL Server databases or SQL Server database components.

- **General tab**—(SQL Server, SQL Server database, SQL Server database component) Displays the name of the application, the total capacity reserved for the application, and its operating status:

Table 15 Operating status: SQL Server properties

Status indicator	Value
OK	SQL Server is running and storage is online. No alerts.
Warning	See the Alerts list for more information.
Critical	See the Alerts list for more information.

- **Details tab** — (SQL Server database) — (SQL Server database) Displays the following SQL Server values:

Table 16 Details tab: SQL Server database properties

Property	Value
SQL Server	Name of server where SQL Server storage is being hosted.
SQL server status	Operational status of the SQL Server.
Version	Version of SQL Server.
Database status	Operational status of the SQL Server database.
Workload type	Workload type of the SQL Server database.
Clustered	Indicates whether the server that hosts SQL Server is part of a cluster.

- **Snapshots tab** — (SQL Server database) Allows you to schedule snapshots of the database. For more information, see "Scheduling and running snapshots" on page 33.
- **Backup tab** — (SQL Server database) Allows you to schedule backups of the database. See "Scheduling backups" on page 36 for more information.
- **Replication tab** — (SQL Server database) Allows you to configure data replication of the database. See "Running replication" on page 40 for more information.
- **Storage tab**—(SQL Server database component) Displays the database component's storage space, including allocated space, used space, free space, and the following storage allocation details:

Table 17 Storage tab: SQL Server database component properties

Property	Value
Application Path	Path to the file directory on the server that hosts SQL Server where the database component's data is saved by SQL Server. The file directory is located on the volume created on the iSCSI LUN exported by ASM to the server that hosts SQL Server.
Protocol	Communication protocol used to transfer data between the server that hosts SQL Server (and the database component) and your HP Storage Server.
Application Server Host Name	Name of server that hosts SQL Server and the database component.

Property	Value
Application Server Volume - Name	Name of the volume on the server that hosts SQL Server to which SQL Server saves the database component's data. The volume resides on the iSCSI LUN (logical disk) exported by ASM to the server that hosts SQL Server.
Application Server Volume - Status	Status of the volume on the server that hosts SQL Server where the database component is stored.
Application Server Volume - Exclusive Storage	Indicates if database component storage is configured with exclusive storage. See Table 5 on page 23 for more information.
Application Server Volume - RAID Level	The RAID level to which the database component storage is configured. See Customizing RAID levels on page 24 for more information.
Application Server Volume - RAID Stripe Size	The RAID stripe size to which the database component's storage is configured. See Table 5 on page 23 for more information.
Application Server Volume - Read Cache	Speeds up reads when enabled. This setting is determined by the storage array, not ASM.
Application Server Volume - Write Cache	Speeds up writes when enabled. This setting is determined by the storage array, not ASM.
Application Server Volume - Number of Hot Spares	The number of hot spares with which the database component storage is configured. See Table 5 on page 23 for more information.
Application Server Volume - Mount Paths	Path the volume is mounted on, on the server that hosts SQL Server. The volume is built on the iSCSI LUN exported by ASM to the server that hosts SQL Server.

- **Warning Threshold tab**—(SQL Server database component) Allows you to change the percent full warning threshold value for the database component. See Setting a percent full warning threshold on page 26 for more information.
- **Data File or Log tab**— (SQL Server database component) One of these two tabs is available depending on whether the database component is a data file or log.
- **Data File tab**—Displays the data file's free space and the following storage allocation details about the SQL Server data file:

Table 18 Data File tab: SQL Server database component properties

Value	Description
Data File Name	Name of database data file.
Filename	Relative path to where the database data file is stored on the server that hosts SQL Server.
File Group	File group of data file. This value is assigned by SQL Server.
Data File Space Available	Free storage space available for data file.

- **Log tab**—Displays the log file's free space and the following storage allocation details about the SQL Server log file.

  Table 19 Log tab: SQL Server database component properties

Value	Description
Log Name	Name of database log file.
File Name	Relative path to where the database log file is stored on the server that hosts SQL Server.

Accessing properties for user-defined applications

ASM provides properties information for the user-defined applications on your HP Storage Server. Using properties information, you can determine the status of all user-defined application areas monitored by ASM, and any warning or critical status indicators.

1. In the Actions pane, select **Application View**.
2. From the Filter drop-down menu, select **User-Defined** or **Show all**.
3. To select properties for the user-defined application pool:
   - Select **User-Defined** in the content pane and then click Properties in the Actions pane.

     or
   - Right-click **User-Defined** in the content pane and select **Properties**.

   For a user-defined application:
   - Select any user-defined application in the content pane and then click **Properties** in the Actions pane.

     or
   - Right-click any user-defined application in the content pane and select **Properties**.

Properties window

- **General tab**—Displays the user-defined application name, name of the application server that runs the user-defined application, and the application area status:

  Table 20 Operating status: User-defined application properties

Status indicator	Value
OK	Application storage is online. No alerts.
Warning	See the Alerts list for more information.
Critical	See the Alerts list for more information.

- **Storage tab**—Displays the user-defined application's storage space, including allocated space, used space, free space, and the following storage allocation details:

Table 21 Storage tab: User-defined application properties

Property	Value
Application Path	Path to the file directory on the application server where the user-defined application data is saved by the user-defined application. The file directory is located on the volume created on the iSCSI LUN that was exported by ASM to the application server.
Protocol	Communication protocol used to transfer data between the server that hosts the user-defined application and your HP Storage Server.
Application Server Host Name	Name of server that hosts the user-defined application.
Application Server Volume - Name	Name of the volume on the application server to which the user-defined application saves its data. The volume resides on the iSCSI LUN (logical disk) exported by ASM to the application server.
Application Server Volume - Status	Status of the volume on the application server where the user-defined application data is stored.
Application Server Volume - Exclusive Storage	Indicates if user-defined application storage is configured with exclusive storage. See Table 5 on page 23 for more information.
Application Server Volume - RAID Level	The RAID level to which the user-defined application storage is configured. See Customizing RAID levels on page 24 for more information.
Application Server Volume - RAID Stripe Size	The RAID stripe size to which the user-defined application storage is configured. See Table 5 on page 23 for more information.
Application Server Volume - Read Cache	Speeds up reads when enabled. This setting is determined by the storage array, not ASM.
Application Server Volume - Write Cache	Speeds up writes when enabled. This setting is determined by the storage array, not ASM.
Application Server Volume - Number of Hot Spares	The number of hot spares with which the database component storage is configured. See Table 5 on page 23 for more information.
Application Server Volume - Mount Paths	Path the application server volume is mounted on. The volume is built on the iSCSI LUN exported by ASM to the application server.

- **Warning Threshold tab**—Allows you to change the percent full warning threshold value for the user-defined application. See Setting a percent full warning threshold on page 26 for more information.
- **Snapshots tab** — Allows you to schedule snapshots of the user-defined application. For more information, see "Scheduling and running snapshots" on page 33.
- **Backup tab** — Allows you to schedule backups of the user-defined application. See "Scheduling backups" on page 36 for more information.
- **Replication tab** — Allows you to configure data replication of the user-defined application. See "Running replication" on page 40 for more information.

Accessing properties for virtual libraries

ASM provides properties information for virtual libraries on your HP Storage Server. Using properties information, you can determine the status of all remote backup virtual libraries monitored by ASM, and any warning or critical status indicators.

1. In the Actions pane, select **Application View**.
2. From the Filter drop-down menu, select **Data Protection** or **Show all**.
3. To select properties for the virtual library:
   - Select a virtual library in the **Remote Backup Virtual Libraries** area of the content pane and then click Properties in the Actions pane.

     or
   - Right-click a virtual library in the **Remote Backup Virtual Libraries** area of in the content pane and select **Properties**.

Properties window

- **General tab**—Displays the virtual library name, storage area type, the virtual library status:

  Table 22 Operating status: Virtual library properties

Status indicator	Value
OK	Virtual library is online. No alerts.
Warning	See the Alerts list for more information.
Critical	See the Alerts list for more information.

- **Storage tab** — Displays the virtual library's storage space, including allocated space, used space, free space, and the following storage allocation details:

  Table 23 Storage tab: Virtual library properties

Property	Value
Application Path	Path to the virtual library folder on the server.
Storage Server Host Name	Name of the host server for your virtual library.
Storage Server Volume - Name	Name of the volume on your HP Storage Server where the virtual library is stored.
Storage Server Volume - Status	Status of the volume that holds the virtual library on your HP Storage Server.
Storage Server Volume - Mount Paths	Path to where the volume that holds the virtual library on your HP Storage Server is mounted.
Logical Disk- RAID Level	The RAID level to which the virtual library's storage is configured. See Customizing RAID levels on page 24 for more information.
Logical Disk- RAID Stripe Size	The RAID stripe size to which the virtual library's storage is configured. See Table 5 on page 23 for more information.
Virtual array - Number of Hot Spares	The number of hot spares with which the virtual library storage is configured. See Table 5 on page 23 for more information.

Property	Value
Virtual array - Physical disk type	Type of physical disk designated for the hot spare. Physical disk types include SAS, SATA, and SCSI.

- **Warning Threshold tab** — Allows you to change the percent full warning threshold value for the user-defined application. See Setting a percent full warning threshold on page 26 for more information.
- **Virtual Library tab** — Displays the virtual library's remaining storage capacity, and the following virtual library details:

Table 24 Virtual Library tab: Virtual library properties

Property	Value
Device name	Name of the virtual library.
Machine name	Name of machine hosting the virtual library.
Device path	Location of the virtual library.
Slot count	Number of slots used for a virtual library.

Accessing properties for replication target components

ASM provides properties information for replication target components on your HP Storage Server. Using properties information, you can determine the status of all replication target component properties monitored by ASM, and any warning or critical status indicators.

1. In the Actions pane, select **Application View**.
2. From the Filter drop-down menu, select **Data Protection** or **Show all**.
3. To select properties for the replication target component:
   - Select a replication target component in the **Replication Sources** area of the content pane and then click Properties in the Actions pane.

     or
   - Right-click a replication target component in the **Replication Sources** area of in the content pane and select **Properties**.

Properties window

- **General tab** — Displays the replicated data group or area name, source data type, total storage capacity of the source (for storage areas) and status:

Table 25 Operating status: Replication target component properties

Status indicator	Value
OK	Replication target component is online. No alerts.
Warning	See the Alerts list for more information.
Critical	See the Alerts list for more information.

- **Details tab** — Displays the following replication target component values:

  Table 26 Details tab: Replication target component properties

Property	Value
Replication source host name	Name of server that hosts the replication source component.
Status	Operational status of the server that hosts the replication source component.
Bandwidth limit	Indicates bandwidth limit schedule status for the replication target component.
Compression	Indicates the compression status for the replication target component.

- **Storage tab**— Displays the replication target component's storage space, including allocated space, used space, free space, and the replication target path.
- **Warning Threshold tab** — Allows you to change the Percent Full Warning Threshold value for the replication target component. See Setting a percent full warning threshold on page 26 for more information.
- **Snapshots tab** — Allows you to view the snapshot schedule of the replication target component. The snapshot schedule can only be set or modified on the system that hosts the original data of the component.
- **Backup tab** — Allows you to schedule backups of the replication target component. See "Scheduling backups" on page 36 for more information.
- **Replication tab** — Allows you to configure data replication of the replication target component. See "Running replication" on page 40 for more information.

Storage View

Storage View displays the used and allocated storage space of the storage areas (logical disks and volumes) on your HP Storage Server that were created by ASM to store application data and shared folders.

- In the Actions pane, select **Storage View**.
- To view the storage area properties for all applications and shared folders hosted on your HP Storage Server, select **Show all** from the Filter drop-down menu, located at the top of the content pane.

Storage area properties are displayed in order of hierarchy in an expandable and collapsible view. For example, all the volumes on your HP Storage Server are displayed under the logical disks they reside on, and all the applications and shared folders hosted on your HP Storage Server are displayed under the volumes on which they are stored. Application components and individual shared folders are displayed under the application or shared folders pool to which they belong.

Click the Expand tree icon next to each logical disk name to view the volume's storage properties. Click the Collapse tree icon next to expanded logical disks to hide the volume's storage properties.

ASM assigns a drive letter to each volume on a logical disk. The drive letter can be viewed on the volume's Properties window. See Accessing properties for HP Storage Server volumes on page 61 for more information.

NOTE:

A logical disk can only have one RAID configuration, so an application's components will reside on more than one logical disk if different RAID levels are selected for the application components using the storage-allocation wizard.

To view all the storage properties for an item listed in the content pane, see Accessing storage area properties.

Accessing storage area properties

When Storage View is selected in the Actions pane, you can view the storage status, alerts, and properties for the following storage areas on your HP Storage Server:

- Volumes
- Logical disks

Do one of the following:

- Select the item in the content pane and then click **Properties** in the Actions pane.
- Right-click the item in the content pane and select **Properties**.

Accessing properties for HP Storage Server volumes

ASM provides properties information for any volume on a logical disk on your HP Storage Server.

1. In the Actions pane, select **Storage View**.
2. Do one of the following:
   - Select any Volume (Vol) area in the content pane and then click **Properties** in the Actions pane.
   - Right-click any Volume (Vol) area in the content pane and select **Properties**.

Accessing properties for HP Storage Server logical disks

ASM provides properties information for the logical disks created on your HP Storage Server by ASM.

1. In the Actions pane, select **Storage View**.
2. Do one of the following:
   - Select any logical disk in the content pane and then click **Properties** in the Actions pane.
   - Right-click any logical disk in the content pane and select **Properties**.

Properties window

ASM provides properties information for any logical disks and for any logical disk created on your HP Storage Server.

General tab—Based on the application opened, logical disks or volumes, it will list the operating status for that application only.

Table 27 Operating status: General tab

Status indicator	Value
OK	The storage is online. No alerts.
Warning	See the Alerts list for more information.
Critical	See the Alerts list for more information.

Storage tab—Displays the unallocated space, used space, free space on the volume, and also details on your volume or logical disk properties, depending on the application open:

Table 28 Storage tab: HP Storage Server logical disk properties

Property	Value
System Name	Name the system uses to identify the logical disk.
Physical Disks	Globally unique identifier(s) of the hard drive(s) used by the logical disk for storage.
Exclusive Storage	Indicates if the logical disk is configured with exclusive storage. See Table 5 on page 23 for more information.
RAID Level	The RAID level to which the logical disk is configured. See Customizing RAID levels on page 24 for more information.
RAID Stripe Size	The RAID stripe size to which the logical disk is configured. See Table 5 on page 23 for more information.
Read Cache	Speeds up reads when enabled. This setting is determined by the storage array, not ASM.
Write Cache	Speeds up writes when enabled. This setting is determined by the storage array, not ASM.
Number of Hot Spares	The number of hot spares with which the logical disk is configured. See Table 5 on page 23 for more information.
Unmanaged Data	Space on the logical disk used to store data that is not managed by ASM.
Free Space	Unused storage space on the logical disk that is not allocated.

Table 29 Storage tab: HP Storage Server volume properties

Property	Value
Storage Server Host Name	Name of your HP Storage Server.
Storage Server Volume - Name	Name of the volume on your HP Storage Server.
Storage Server Volume - Status	Status of the volume on your HP Storage Server.
Storage Server Volume - Exclusive Storage	Indicates if volume is configured with exclusive storage. See Table 5 on page 23 for more information.

Property	Value
Storage Server Volume - RAID Level	The RAID level to which the volume is configured. See Customizing RAID levels on page 24 for more information.
Storage Server Volume - RAID Stripe Size	The RAID stripe size to which the volume is configured. See Table 5 on page 23 for more information.
Storage Server Volume - Read Cache	Speeds up reads when enabled. This setting is determined by the storage array, not ASM.
Storage Server Volume - Write Cache	Speeds up writes when enabled. This setting is determined by the storage array, not ASM.
Storage Server Volume - Number of Hot Spares	The number of hot spares with which the shared folder's storage is configured. See Table 5 on page 23 for more information.
Storage Server Volume - Mount Paths	Path on which the volume on your HP Storage Server is mounted.

Application Server View

Application Server View lists your HP Storage Server and the application servers with storage hosted on your HP Storage Server. Expand **HP Storage Server** to display the top-level shared folders on your HP Storage Server. Expand the application servers listed to display the application server volumes and the applications hosted on the volumes.

- In the Actions pane, select **Application Server View**.
- To view the properties for all application servers with storage hosted on your HP Storage Server, select **Show all** from the Filter drop-down menu, located at the top of the content pane.

Application server properties are displayed in order of hierarchy in an expandable and collapsible view. For example, all the volumes created on the iSCSI LUNs (logical disk) exported by ASM to the application server are displayed under the application server, and all the application components hosted from the application server are displayed under the application server.

Click the Expand tree icon next to each application server to view the used and allocated storage properties for the volume and application components. Click the Collapse tree icon next to an expanded application server to hide the volume and application component storage properties.

To view all the storage properties for an item listed in the content pane, see Accessing application server properties.

Accessing application server properties

When Application Server View is selected in the Actions pane, you can view the storage status, alerts, and properties for the following:

- Volumes created on the iSCSI LUNs (logical disks) exported by ASM to the application servers
- Shared folders and application components (same information displayed on Application View)

Do one of the following:

- Select the item in the content pane and then click **Properties** in the Actions pane.
- Right-click the item in the content pane and select **Properties**.

See "Accessing application and shared folder properties" on page 48 for descriptions of shared folder and application component properties.

Accessing properties for application server volumes

ASM provides properties information for application server volumes created on the iSCSI LUNs exported by ASM to the application server.

1. In the Actions pane, select **Application Server View**.
2. Do one of the following:
   - Select an application server volume in the content pane and then click **Properties** in the Actions pane.
   - Right-click an application server volume in the content pane and select **Properties**.

3. Click one of the following tabs:

- **General tab**—Displays the name of the volume on the application server, the volume type, and status:

  Table 30 Operating status: Application server volume properties

Status indicator	Value
OK	The storage is online.
Warning	See the Alerts list for more information.
Critical	See the Alerts list for more information.

- **Storage tab**—Displays the unallocated space, used space, free space on the volume, and the following storage allocation details:

  Table 31 Storage tab: Application server volume properties

Property	Value
Application Server Host Name	Name of the application server where the volume resides.
Application Server Volume - Name	Name of the volume on the application server. Volume is located on the iSCSI LUN exported by ASM.
Application Server Volume - Status	Status of the volume on the application server.
Application Server Volume - Exclusive Storage	Indicates if the volume on the application server is configured with exclusive storage. See Table 5 on page 23 for more information.
Application Server Volume - RAID Level	The RAID level to which the volume on the application server is configured. See Customizing RAID levels on page 24 for more information.
Application Server Volume - RAID Stripe Size	The RAID stripe size to which the volume on the application server is configured. See Table 5 on page 23 for more information.
Application Server Volume - Read Cache	Speeds up reads when enabled. This setting is determined by the storage array, not ASM.
Application Server Volume - Write Cache	Speeds up writes when enabled. This setting is determined by the storage array, not ASM.
Application Server Volume - Number of Hot Spares	The number of hot spares with which the volume on the application server is configured. See Table 5 on page 23 for more information.
Application Server Volume - Mount Paths	Path the volume is mounted on.

Storage Utilization View

Storage Utilization View displays the allocated storage values for specific applications and the shared folders pool, the unallocated storage value, and the storage value for data not managed by ASM in a pie chart.

- In the Actions pane, select **Storage Utilization View**.

The storage value for each application hosted, the shared folders pool, unallocated storage, and data not managed by ASM is displayed according to its percentage of total capacity, using colors selected in the Color Options window.

The total capacity of your HP Storage Server is divided into the following areas:

- **Exchange**—Storage allocated to host Exchange storage group components.
- **Shared Folders**—Storage allocated to host shared folders.
- **SQL Server**—Storage allocated to host SQL Server database components.
- **User-defined**—Storage allocated to host user-defined applications.
- **Data Protection** — Storage allocated to host snapshots, backups, and replicated data.
- **Unallocated**—Unused storage that is not allocated.

  The unallocated space value is the total unused space on your HP Storage Server that has not been allocated to host application or shared folder storage. Unallocated storage includes raw (unconfigured) storage and unused configured storage (logical disks).
- **Unmanaged**—Storage used by data that is not managed by ASM.

  The unmanaged value is the total storage being used to store data not managed by ASM, such as application or shared folder data no longer managed by ASM because the application components or shared folder was removed from view (see "Removing application areas from view" on page 44) and any other data saved on your HP Storage Server that is not managed by ASM.

NOTE:

Logical disks (LUNs) being used to store application data or shared folders cannot be grown (increased in size) by ASM using space on unused logical disks (configured storage); they can only be grown using raw storage.

Unused logical disks are reallocated by ASM when an unhosted application component, shared folder, or user-defined application's storage is hosted using a storage-allocation wizard and the advanced configuration settings selected in the wizard match those of the unused logical disk. You can find the advanced configuration settings and capacities of unused (and used) logical disks on the Properties window for each logical disk (see Accessing properties for HP Storage Server logical disks on page 61).

All-in-One Storage Manager Alerts

ASM generates an alert when the status of an application area or storage area changes from OK to Warning or Critical. The alerts describe the condition that caused the storage status to change. When an alert is generated, a **One or more alerts exist** message appears in the ASM content pane. Click the message to display a list of current ASM alerts.

NOTE:

ASM rolls up any status alert to the highest level. For instance, if a shared folder has surpassed its percent full warning threshold and exceeded its allocated storage space, a warning icon is shown on the shared folders pool icon. Likewise, if a critical status exists in an Exchange mail store, the critical icon is also shown on the Exchange storage group icon.

Glossary

This section defines the terms used to describe the ASM user interface and program features.

Actions pane The right pane in the main window of the ASM user interface that provides a list of actions, based on your current selection in the Content pane. Along with other selectable items, the Actions pane provides access to storage-allocation wizards, which help you allocate and configure storage.

Advanced Storage Properties dialog box A dialog box accessed by clicking the Advanced button in the Storage Allocation page in any of the storage-allocation wizards. This dialog box allows you to change the size of the allocated space and the default (recommended) advanced configuration settings.

allocated space Storage space that is being used by, or reserved for, application or shared folder storage.

application server A server computer in a computer network dedicated to running certain software applications whose job is to provide network access to software client/server applications and, sometimes, the data that belongs to applications as well.

array Also known as a JBOD (just a bunch of disks). A group of hard drives in an enclosure (chassis) that are controlled by an array controller.

array controller Controls reads and writes to the hard drives in an array.

backups A read-only copy of data copied to media, such as hard drives or magnetic tape, for data protection.
A full backup copies all the data selected to be backed up. An incremental backup copies only data selected to be backed up that has changed since the last full backup.
Backups provide data protection in the event of system or hard drive failure, because the data is stored on media separate from the system hard drives.

backup application An application used to create, manage, and monitor backups.

CIFS Common Internet file system. The protocol used in Windows environments for shared folders.

Content pane The center pane in the main window of the ASM user interface that displays storage utilization, and the storage status of application components and shared folders.

data migration The process of moving data from one storage device to another, such as moving application data from an application server to your HP Storage Server. ASM supports automatic data migration for Exchange and SQL Server data.

data protection Protects data from being corrupted or lost as a result of hard drive failure. Methods used to provide data protection include RAID and backups.

enforce allocated limit (quota) An enforced quota for the amount of storage available to a shared folder. An enforce allocated limit prevents data from being saved to a shared folder once all the storage space allocated to the shared folder is used.

Exchange storage group The fundamental unit of storage management in Microsoft Exchange. Storage groups consist of Mail stores, Public stores, and log files.

exclusive storage An Advanced window option that allows you to dedicate a hard drive(s) for storing data for a specific application component or shared folder.

file system A method for storing and organizing computer files and the data they contain to make it easy to find and access them.

hot spares An Advanced window option that allows you to reserve one or two hard drives as spares. A hot spare is a hard drive reserved as a spare for storage space configured as RAID 1, RAID 1+0(10), or 5. A hot spare automatically replaces a hard drive when it fails.

iSCSI Internet small computer system interface. Like an ordinary SCSI interface, iSCSI is standards-based and efficiently transmits block-level data between a host computer (such as a server that hosts Exchange or SQL Server) and a target device (such as an HP Storage Server). By carrying SCSI commands over IP networks, iSCSI is used to facilitate data transfers over intranets and to manage storage over long distances.
ASM works with the Microsoft iSCSI Target, which builds the iSCSI infrastructure on application servers with data hosted on your HP Storage Server and on your HP Storage Server so that application data is stored on your HP Storage Server.

iSCSI LUN A type of LUN (logical disk) created on an application server by ASM when a storage-allocation wizard is ran to host application storage. When application storage is hosted using ASM, all storage communication passes through the iSCSI LUN on the application server to the LUN on your HP Storage Server. This allows data saved by the application to the iSCSI LUN on the application server to be transparently stored on your HP Storage Server instead.

log file The component of a Microsoft Exchange storage group or a Microsoft SQL Server database that contains log data.

logical disk Also known as a LUN. A logical disk contains one or more volumes and spans multiple hard drives in an array. RAID configuration of storage is performed at the logical disk level.

LUN Also known as a logical disk. ASM will grow a LUN (make it larger) when the LUN requires more of the storage space on an array.

Mail store The component of a Microsoft Exchange storage group that contains mailbox data.

Menu bar The horizontal menu located at the top of the ASM user interface. The menu bar is the Microsoft Management Console menu bar; ASM is a snap-in hosted by the Microsoft Management Console.

MMC snap-in Microsoft Management Console snap-in. An application added to the Microsoft Management Console. All-in-One Storage Manager is a MMC snap-in.

NAS Network-attached storage. This term is used to refer to a specialized type of file server. The HP Storage Server provides NAS storage as well as iSCSI storage.

Navigation pane The left pane in the main window of the ASM user interface that allows you to quickly navigate between HP Storage Server Management applications.

NFS Network file system. The protocol used in most Unix environments to share folders or mounts. The Create a Shared Folder Wizard does not create NFS shares, but NFS shares can be created using the Shared Folder MMC snap-in.

percent full warning threshold Percentage of capacity for a storage area (storage allocated to an application component or shared folder) at which an alert is generated. This alert is displayed in the Content pane and sent to the Windows Event Log. See Setting a percent full warning threshold on page 26 for more information.

Public store The component of a Microsoft Exchange storage group that contains public folder data.

RAID Redundant array of intelligent disks. Two or more hard drives configured to provide a storage with resilience to hard drive failure through the use of RAID striping and parity disks.

RAID level See for RAID level descriptions.

RAID striping Writing data to hard drives in an array by interleaving bytes or groups of bytes across the multiple hard drives. This allows more than one disk to be read from or written to simultaneously, which increases the performance.

RAID stripe size The number of bytes or kilobytes of data in a RAID stripe (block of data).

restore To recover lost data using a backup.

revert To return stored data to a previous state using a snapshot.

scaling Changes the display proportions of application component and shared folder storage in the Content pane. You can choose to scale by the size (capacity) of the application component and shared folder's storage space, or scale them all the same. To change the scale setting, select Tools > Options.

size The amount of storage that ASM allocates and configures for an application component or shared folder. To change the size of the allocated storage for an application component or shared folder, select the application component or shared folder in the Content pane and then select **Allocate Space** in the Actions pane.

snapshot A read-only copy of a volume at a specific point in time. Unlike a backup, data is not copied to any media during a snapshot. Instead, when a file is modified after a snapshot is created, the new updates are written to a new location. The file-system maintains records and pointers to keep track of the snapshot data and file changes. A snapshot takes less than a second to create.

Status bar The area located at the bottom of the ASM user interface that displays server information and system alerts.

tape library An enclosure filled with magnetic tape cartridges, tape drives, and a robot(s). The tapes are electronically labeled for identification and stored in library slots when not in use. When data needs to be written or read from a tape, the robot loads the tape cartridge into an available tape drive in the library.

Task Viewer	A window that displays completed tasks, scheduled tasks, and errors. To open the Task Viewer, select Tools > Task Viewer.
toolbar	The area below the menu bar that contains icons for commonly-used commands. The toolbar is the Microsoft Management Console toolbar; ASM is a snap-in hosted by the Microsoft Management Console.
top-level share	Top-level shared folder in a directory hierarchy.
unallocated space	Unused storage that is not allocated. Unallocated space includes raw (unconfigured) storage and unused configured storage (logical disks).
user-defined application	Any remote application that runs under Windows Server 2003 and uses NTFS volumes for storage.
virtual array	Hard drives in an array can be divided into groups to create two or more virtual arrays. ASM grows a virtual array (makes it bigger) when a hard drive(s) must be added to the virtual array to obtain the required storage space. A virtual array contains one or more LUNs.
virtual library	Also known as a virtual tape library. A virtual library acts like a physical tape library except that hard drive arrays are used for storage instead of magnetic tapes.
volume	Resides on a logical disk. Volumes are assigned a drive letter on the file system and contain file directories.
warning threshold	See percent full warning threshold.

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